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THE INFLUENCE OF TRAUMA IN THE PRODUCTION OF MOVABLE KIDNEY.*

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The influence of trauma in the production of movable kidney is a subject of special importance to the railway surgeon who is so frequently called on to decide whether or not a movable kidney in a given case is the result of a certain injury or accident. It is a common belief of the profession, as well as of the laity, that a movable kidney is frequently the result of an injury. Most writers on the subject assign to trauma an important place among the etiologic factors, but few of them indeed offer any evidence, such as the report in detail of cases, or of reasoning based on pathologic conditions found, in support of their statements. It is evident, therefore, that the statement has been passed on from one author to another without the subject receiving the careful attention which it deserves.

Before entering in detail into this phase of the question, it will be necessary to consider the etiology in general of movable kidney. It was early observed that the large majority of cases occurred in women, and as movable kidneys were first discovered in women with lax abdominal walls, the result of repeated childbirth, it was at once concluded that repeated pregnancies were the cause of the movable kidneys. More extensive observations, however, gradually disclosed the fact that movable kidneys are much more common than at first supposed; that they frequently occur in the unmarried and in those who have never borne children, and, furthermore, that the right kidney is affected much more frequently than the left. Notwithstanding these facts, repeated pregnancies is still given as the most important cause of movable kidney by almost all authors. Of 126 women examined in order, it was found that those in whom the kidneys were not palpable or abnormally movable—55 in number—the average number of children born per woman was slightly greater than in those in whom movable kidneys were found—some 71 in number. Of 107 cases of movable kidney in women, from the author's records, 40 were single and 65 married, 2 not stated. Of the 65 married women 12 had never borne children; in other words, of 105 women with movable kidneys 52 had never been pregnant and 53 had borne one or more children.

These facts show conclusively that pregnancy in itself is not a material factor in the production of movable kidney. That retrodisplacements and prolapse of the uterus and vagina with lacerations of the perineum are material factors in the production of movable kidney, as stated by some, is likewise disproved by the above facts.

Another commonly stated cause of movable kidney is rapid absorption of the perirenal fat, but there are no facts in support of this statement. On the contrary, clinical experience, as well as observations at the operating table and in the dead-house, are opposed to it. Such a cause should be equally operative in both sexes, but we know how rare the affection is in man as compared to women. The condition is not observed to follow acute wasting diseases, nor is it more common in emaciated subjects. While in some cases the amount of perirenal fat found at operation is small, in others it is abundant, and in the dead-house a small amount of perirenal fat is frequently found without a movable kidney. Movable kidneys are so frequently found in young women who have never been pregnant; whose pelvic organs are normal; whose abdominal walls are firm and, therefore, no diminution of intra-abdominal tension present; who are not emaciated and who have never received any material injury; that all who have given the matter any serious thought and study have been compelled to seek other causes for the condition. The more the subject is studied the more it becomes evident that those in whom movable kidneys are found are defective in bodily form, that they deviate in some particular from the highest normal type.

Thus the investigations of Wolkow and Delitzin show deviations in the anatomic configuration of the posterior abdominal wall. The paravertebral niches in which the kidneys lie and which in the normal well-built individual are deep and show a distinct pear- or funnel-shape, are shallow and of cylindrical shape in those with movable kidneys, thus favoring displacement of these organs. Albarran[1] ranks movable kidneys with the bodily stigmata of degeneracy, and Stiller finds them associated with dilatation of the stomach and a loose tenth rib, which he likewise considers a sign of degeneracy. Becker and Lenhoff[2] found that the least abdominal circumference was much smaller in proportion to the body length in those with movable kidneys than in normal individuals, and the author in a paper[3] read before the American Surgical Association in 1901 demonstrated by a series of careful measurements of the body form that there was a distinct relative contraction or diminution in the capacity of the middle zone of the body in all individuals with movable kidneys. For the method and details of measurement I refer to my article above mentioned. Of 107 cases of movable kidney that I meas-

* Read by invitation before the American Academy of Railway Surgeons at Chicago, Oct. 1-2, 1903.

1. Ann. des. Mal. des. Org. Gen.-urin, 1895.
2. Deutsch. med. Woch., 1898, xxiv, 508.
3. THE JOURNAL A. M. A., June 1, 1901.

ured in this manner, all showed in a greater or less degree the characteristic contraction of the mid zone of the body. This diminution of the size of this body zone necessarily produces a downward displacement of the organs normally contained therein, and the right kidney, owing to the large, non-compressible liver above it, is more affected than the left. It is this depression of the kidneys, particularly the right, together with the shallower paravertebral renal niches of Wolkow and Delitzin, that forms the chief predisposing factors in the production of movable kidney. The mere fact that the kidney is crowded lower than it should be does not in itself produce an abnormally movable organ. There are other factors at work. The lower plane of the mid zone corresponds to the lower border of the costal arch, and usually touches the anterior extremities of the tenth, eleventh and twelfth ribs. In all flexion movements of the body, whether lateral or antero-posterior, in all muscular efforts, such as lifting, straining, coughing, sneezing, etc., in which the lower ribs are adducted, this plane becomes the point of greatest constriction of the body. In individuals with what may be termed normal body forms, the major portion of the kidney lies above this line of constriction, and hence when this plane of the body is narrowed by any of the acts above mentioned, the tendency is not to depress the kidney, but rather to compress it and hold it up, while, on the other hand, in those individuals with contracted mid zones in whom the kidneys are crowded lower than normal, the line of constriction lies above the major portion of the kidney, and, consequently, all acts producing narrowing of this plane tend to depress that organ. The constant repetition of these acts operating to depress the kidney, gradually leads to a stretching and elongation and loosening of the fasciæ and tissues tending to hold this organ in place, thus developing a movable kidney. If the above statements be correct, then it follows that every woman with the characteristic body form ought to have a movable kidney.

All the cases of movable kidney which I measured and examined showed a contraction of the mid zone of the body, and, while I am fully aware of the dangers of generalizing from a few cases, still, as the effects here referred to are the result of well-defined causes, the deduction appears justifiable that all women with contracted mid zones develop movable kidneys of greater or less degree. The causes of the contracted mid zone and the age at which the characteristic body form develops are questions of great practical interest, but a discussion of them here would lead us too far from the question at issue.

With these preliminary remarks on the etiology in general, we may proceed to a consideration of the influence of trauma in the production of movable kidney.

The question may be considered from two standpoints: the histopathologic and the clinical. During the past three years the author has made it a practice to open the peritoneal cavity in operating on movable kidneys. A muscle-splitting incision is made at the anterolateral junction of the abdominal wall, which affords not only free access to the perirenal space and kidney, but also permits a ready examination of the region intraperitoneally by simply incising the lateral fold of peritoneum. Through this incision one may examine on the right side the anterior surface of the kidney through the peritoneum covering it; the range and direction of greatest mobility of the kidney; the ascending and transverse colon; the hepatic flexure; the cecum and appendix; the duodenum; the major portion of the liver with the gall bladder and bile tracts. An examination of this kind gives one a very much better idea of the changes which take place in the tissues which surround and hold in place the kidney than can possibly be obtained through the usual posterior incision. One always finds the perirenal fascia elongated. This fascia is distinct and separable from the peritoneum laterally, but becomes more intimately attached to or blended with the peritoneum ventrad of the kidney proper, from which it is separated by the perirenal fat, variable in amount. The fascia becomes more intimately attached to the kidney at the hilus, where it spreads out over the renal vessels, and on the right side passes dorsad of the duodenum, where it again becomes separated from the peritoneum, which passes ventrad of the duodenum. This fascia with the peritoneum, as already stated, is elongated and can easily be picked up in loose folds, in fact, it forms a veritable pouch, or sac-like covering, varying, of course, in size, in which the kidney moves. The perirenal fat and its attachment posteriorly is so loose as to offer practically no resistance to the mobility of the kidney. The hepatic flexure and transverse colon adjoining descend, so that the pouch in which the kidney moves always lies above the colon. This is not the case on the left side, as here the pouch is usually formed beneath the splenic end of the transverse colon and internal to the descending colon. The attachments of the duodenum become lengthened, so that this portion of the intestine is often very freely movable. In a case operated on recently the descending portion of the duodenum could easily be drawn out into the lateral incision. The liver is often abnormally movable, and at times quite so. Usually its anterior border descends the most, but occasionally the posterior border descends and tilts the superior pole of the kidney forward. The renal vessels become elongated, attaining a length at times of 8 cm. (Hepburn), or even 13 cm. (Legueu). When the perirenal tissues become considerably loosened and the pouch formation well marked, the kidney is very freely movable, and might almost be classed as an intra-abdominal organ, yet the author has never seen anything that approached what might be called a genuine mesonephron.

An examination of the changes above mentioned makes it very evident that they are of slow development, as it is certainly impossible to elongate fasciæ and blood vessels and form distinct loose pouches suddenly. Based on these facts alone many excellent observers doubt the possibility of a sudden or acute origin of a movable kidney. Sulzer[4] says: "I believe that without the acceptance of a particular abnormal body condition a movable kidney can never be the immediate result of a trauma." Keller[5] is also of the opinion that this condition can not be produced suddenly, but requires a considerable time for its development, and that, therefore, a kidney with a distinct range of motion discovered immediately or soon after the receipt of an injury must have been movable before, and its mobility can not thus have been caused by the injury. Büdinger[6] says, concerning the traumatic origin of movable kidney: "A sudden marked dislocation presupposes an extensive loosening of the kidney, and not only that, but a space below the kidney with a considerable change in the relations of the peritoneum." Sterns[7] says: "In the majority of the cases

4. Deutsche Zeitsch. f. Chir., 1891, xxxi, 506.
5. Deutsche Chir., 67.
6. Mittell. aus d. Grenzgebiet., 1898-9, No. 4, 265.
7. Ueber traumatische Entstehung innerer Krankheiten.

so far there occurred not a mobilization of a normally fixed kidney, but a dislocation of an already movable or incompletely fixed organ."

When we turn to the clinical aspect of the subject, we find the evidence presented requires the most careful analysis, as the possibilities of error are very great. Most of the opinions expressed are based on two classes of cases. In the first class a movable kidney is discovered on examination. The patient states that at some time more or less remote a fall or accident of some kind was experienced. The conclusion is immediately reached that the movable kidney is due to the accident. In the second class the same conclusion is reached based on the facts that a patient examined soon after an accident is found to have a movable kidney. The conclusion in neither of these cases is justified by the evidence. In the first case there is usually no relation shown between the nature of the injury and the supposed effect, and no continuity in the symptoms from the time of the injury to that of the discovery of the movable kidney. In the second case the discovery of a kidney with a distinct range of motion immediately or soon after an accident is positive evidence that it existed before, as it certainly takes time to develop a movable kidney. In a third class of cases we find the history something as follows: A person whom the physician knows personally to have been in good health meets an accident involving, perhaps, the region of the kidney. On examination soon after the physician discovers a bruise or contusion of the side with tenderness, and a movable kidney. It would seem here that the injury was certainly the cause of the movable kidney, but the error in the conclusion is due to an error in the premises. Because a person was in good health previous to an accident is no evidence that a movable kidney was not present, as it is a common experience of the examining room to find movable kidneys, the presence of which was not only unknown or unsuspected, but which gave rise to no symptoms whatever.

Sulzer[4] says in regard to the relation of injury to movable kidney: "However, one must be very careful in judging of these relations, for on the one hand we know from other diseases how readily people in general refer their troubles to a particular injury, and on the other hand, we shall see later that on the occasion of a fall, exertion, etc., a movable kidney which is already present may suddenly present severe so-called strangulation symptoms, and thus become first known to the patient or physician after it has existed without symptoms for months or years." Güterbock[6] says: "The pain in a movable kidney which was discovered immediately after an accident is not the slightest proof of any connection between the accident and the movable kidney, nor are all other subjective symptoms any proof, so long as it can not be demonstrated with unequivocal certainty that the kidney was not movable before that time." Just why one individual with movable kidney should have no symptoms whatever of the condition, while another with even a less marked case should suffer great annoyance and discomfort is not always easy to explain.

It is a common observation that a person with a movable kidney not giving rise to any discomfort will suddenly develop symptoms after a slight accident, such as a fall or an unusual muscular effort; after a nervous shock or mental depression. Sometimes the mere knowledge that the condition is present gives rise to symptoms. On the other hand, the author saw a woman who was suffering considerable pain and discomfort in the right side from a movable kidney, which she herself discovered, but supposed was a cancer. The symptoms all disappeared when assured it was not a cancer, but simply a movable kidney. She remained free from further annoyance for several years. Another person may complain of symptoms only when the nervous system or general health is below par.

It will thus be seen that one must be extremely careful in attributing the cause of movable kidney to an event, simply because it is coincident with the development of symptoms. One will search the literature in vain for a satisfactory case in which a movable kidney was found soon after an injury, and in which the absence of the condition had been previously demonstrated by examination.

At this point it is necessary to distinguish between a displaced kidney and a movable one. No one familiar with injuries will doubt for an instant the possibility of suddenly displacing a normal kidney by violence. Such cases, however, are very rare. They have usually followed severe crushing injuries affecting the region of the kidney. The perirenal tissues are always more or less lacerated, the peritoneum frequently torn, and at times when the displacement has been great, the renal vessels themselves have been completely severed. The kidney may also be displaced more slowly by a hemorrhage into the perirenal fat. Subcutaneous injuries of the kidney and perirenal tissues are by no means uncommon. Riese[8] has just reported 491 cases from the literature. In many of these there was hemorrhage into the perirenal space with more or less displacement of the kidney. One might suppose that with absorption of the blood in these cases the kidney might remain movable. While such a result may be possible, it is by no means the rule. On the contrary, it is the rare exception, for with the absorption of the blood and organization of part of the blood clot, new connective tissue is formed, which may fix the kidney even more firmly than it was before, but its location may be slightly altered. Although Güterbock[9] is of the opinion that such perirenal hemorrhages may be the starting point of movable kidneys, he was unable to present any cases in support of his opinion. The case of Peyrot which he quotes was not a case of movable kidney, but of a kidney found somewhat displaced by blood clot at operation two months after a fall. Sterns,[7] in discussing this phase of the question, says that so far he has "never been able to find a single case of perirenal hemorrhage or traumatic pseudohydronephrosis in which later a movable kidney was demonstrated." As bearing on this question I present the following case which I observed a short time ago:

Mrs. K., aged 40 years. In a car accident she received a severe direct injury to the left side of the body, in which the left tenth rib was fractured. A large swelling, hematoma, developed about the left kidney, accompanied by hematuria. The swelling was very painful and she was confined to her bed for several weeks. The swelling was some months in disappearing, and a year after the accident the left kidney was still somewhat enlarged, tender and movable. She also had a very movable right kidney, which had existed for a long time.

Admitting, then, that a movable kidney may have its origin in a perirenal hemorrhage of sufficient size to partially displace that organ and loosen up its fatty and fibrous capsules, still it must be acknowledged, judging from the lack of recorded cases, that such an origin is extremely rare indeed.

8. Centralblt. f. Chir., 1903, Beilage 3, No. 36, p. 141.
9. Arch. f. klin. Chir., 51, 225.

The class of cases, however, which most frequently comes before the railroad surgeon is of another kind. Of course, many cases of severe and serious injuries are encountered in railroad surgery, but those in which movable kidney is alleged to have resulted are usually not of the severer kind. The most frequent accidents are falls while alighting from or attempting to board cars; jars and general concussion from collisions, or by reason of the cars jumping the track, etc. In the majority of cases the movable kidney has not been discovered for some weeks or months after the accident, when the case has been worked up by the personal injury lawyer and doctor. The influence of these latter factors on the patient is often very great, and might furnish the basis for a very interesting study.

But laying all such questions aside for the present, let us consider what influence, if any, trauma may have had in the production of movable kidney in these cases. I have analyzed 1,300 cases of railroad injuries that have come under my supervision during the past two years. Of this number 728 were males and 572 females. Although several of the males presented symptoms indicating injury to the kidney, there were no cases of movable kidney observed. Among the 572 females there were 41 cases of movable kidney in which the question of a traumatic origin arose. The ages of these patients ranged from 16 to 62 years; 28 were married and 13 single. Both kidneys were movable in 9 cases, the right alone in 32. In no case was the left kidney alone found movable. In 20 cases measurements of the body form were made, and all without exception possessed the characteristic body form with contraction of the middle zone.

It should be remembered in considering the details of these cases that they were all suits for damages. The manner in which the injury was received was based on the patient's own statements, and at times was not borne out by the evidence. It is well known, too, that the patient's statements as to symptoms, previous state of health, etc., must be received and weighed with great care and judgment, for they often have not the same significance and value as the statement of a patient seeking relief of a physician under ordinary circumstances.

Of the 41 cases 9 were seen and examined within thirty days after the accident.

CASE 1.—Miss B., aged 21, single. While she was standing up in a car, about to get off, the car bumped into a car ahead and she was thrown against an upright post, striking the right side of the abdomen. She got on another car and rode several miles down town; she had a hysterical fit and was taken home. I examined her the next day. She was a slender woman, of nervous temperament. Pulse 82. Temperature 98.2. No bruises were to be seen anywhere on the body. The right kidney was movable to one inch below the umbilicus. It was not tender nor painful on motion.

CASE 2.—Mrs. D., aged 31, married, was riding in a buggy which was struck by a passing car. She was thrown forward and got her foot caught in the spokes of the wheel, spraining her ankle. She was pregnant four months, but did not miscarry. She was examined six days after the accident. There were no objective evidences of injury except that to the ankle. Right kidney was movable to the second degree.

CASE 3.—Mrs. J. W., aged 22, married, in a collision was thrown forward and backward, then fell on the floor. She continued on her journey, remained away visiting all day and night, and returned home next day. She was not laid up at all, but claimed injury to her back, a sprain of the lumbar region, and bruises of her back, right elbow and both legs. Examination 13 days after the accident showed no bruises about back or elbow. There were two small bruised spots on the legs. The right kidney was movable to the second degree, and not tender. There were no symptoms referable to the kidney. The contracted middle zone was shown by measurement.

CASE 4.—Mrs. F. A., aged 22, married. The car in which she was riding collided with a wagon, and she was thrown back in her seat. She was frightened because she saw someone fall off the car. She was seven weeks pregnant and miscarried five days later. Examination 18 days after accident showed that she had recovered nicely from the miscarriage. The right kidney was movable to the second degree, but there was no tenderness or soreness about it. No bruises were found anywhere about the body.

CASE 5.—Mrs. S. S., aged 21, married, was thrown to the floor of a car by a collision. She fractured the right forearm and bruised her right side. Her physician stated that he found a small amount of blood in her urine soon after the accident, but when examined 17 days after the accident the urine was normal. The right kidney was movable to the second degree. It was somewhat tender, but was not enlarged, nor was there any enlargement or thickening about it.

CASE 6.—Mrs. N. D., aged 32, married, in a collision was thrown forward, then backward. She struck first on the front of the chest and epigastric region, then on the elbow, arm and back. The injury complained of was to her elbow, arm and shoulder, with tenderness in the epigastric region. Examination 23 days after accident showed the right kidney movable to the second degree, bruises of the arm at the shoulder and the elbow. There were no symptoms of injury to the kidney.

CASE 7.—Miss S., aged 27, was sitting in a car, the side of which was struck by another car; this jarred her back. She was menstruating at the time. Her physician said he discovered a movable kidney very soon after the accident, and that she had blood in the urine, which in all probability was simply the menstrual blood. Examination 27 days after the accident showed the right kidney movable to the second degree. Measurement showed typical body form.

CASE 8.—Mrs. S., aged 26, married, was getting on a car just as it started. She did not fall but swung around. She claimed a wrench of her side and her hips, although she did not feel anything at the time. She was not laid up, and had no physician. She complained of backache and pain in her side. Examination 27 days after accident showed a nervous, anemic woman, with characteristic body form and both kidneys movable to the second degree. The uterus was retroverted and the patient had leucorrhea.

CASE 9.—Mrs. K., aged 61, married, asserts that while walking on the street she was struck by a car, knocked down and rolled under the fender. She was able to get up alone, went home in a car and was in bed ten days. She asserted that her whole right side was bruised from her neck down. Her physician said he found blood in the urine; that the right kidney was pushed out of its capsule; that she had two attacks of uremia from kinking of the ureter; and that he was obliged to massage the kidney back into place. When examined 27 days after the accident she was up and visiting friends. No bruises of any kind were to be found. The right kidney was found movable, but the urine was clear.

These 9 cases were examined so soon after the accident, and the kidneys were found so very movable and so free from unusual tenderness that it is very evident that in none of the cases was the accident the cause of the mobility. The injuries received were not severe in any of them, Case 5, with a broken forearm, being the worst perhaps in this respect. Case 9, which at first glance seems to show a causal relation between the injury and the movable kidney, must be rejected. The statements of the patient and her physician were not believed, for reasons which need not be mentioned. The case was afterward settled for a very nominal amount.

There were 6 cases which were examined within three months after the accident.

CASE 10.—Mrs. M., aged 57, married, fell on her right side while getting off a car. She claimed womb trouble with frequent urination as a result. Examined two months after the accident, there was found a laceration of the perineum with prolapse of the uterus and vagina. She had had eight children. There was a very pendulous abdomen with general visceral ptosis and a movable right kidney. It was very evident that none of these conditions resulted from the fall, and the case is therefore rejected as showing causal relations.

CASE 11.—Mrs. G., aged 25, married, fell on her left side and abdomen while getting off a car. She was two months pregnant and miscarried. She had had two children. Examination, a little over two months after the accident, showed a laceration of the perineum, a tender uterus, prolapsed ovaries, and the patient pale, weak and nervous. The right kidney was very movable to the third degree and somewhat tender. As she had been in bed most of the time since the fall on account of the miscarriage, and as there had been no symptoms referable to the kidney, it was very evident that such a high degree of mobility could not have been produced by the fall.

CASE 12.—Mrs. T., aged 36, married, was thrown from a car while turning a corner and struck on her left side, shoulder and hip. She was examined less than two months after accident. Five years ago she had been ill with peritonitis for six weeks, and had had pain and soreness in abdomen since. She was very nervous and hysterical. There was a small bruise over the sacrum. The right kidney was very movable. There were no symptoms referable to the kidney. The movable kidney was undoubtedly of long duration.

CASE 13.—Mrs. W., aged 31, married, did not fall, but in getting on a car she was swung around against the side of the car. Her injury was not severe in any sense. Examination two and a half months after accident showed a very characteristic body form and both kidneys movable to the second degree. There was a marked pulsation of the abdominal aorta. No possible connection could be found between the injury and the movable kidneys.

CASE 14.—Mrs. M., aged 40, a widow, owing to sudden stopping of a car was thrown forward, then backward, striking her right side against the seat. She was in bed four weeks. There were no symptoms of injury to the kidney. She complained of loss of hearing, headache and pain in the right side. Examination three months after the accident showed diminished hearing in both ears from chronic middle-ear trouble and the right kidney movable to the third degree. The high degree of mobility and the marked contraction of the middle zone show clearly that the kidney had undoubtedly been movable many years.

CASE 15.—Mrs. P., aged 29, married, fell to the floor as the car in which she was traveling started, injuring her right knee and her left side. She complained of the knee and of excessive flowing. Examination three months after the accident showed an injury to the right knee, a prolapsed left ovary and chronic endometritis. The right kidney was movable to the second degree. The nature of the injury and the lack of symptoms excludes the accident as the cause of the movable kidney.

There were 5 cases examined from four to six months after the accident. Of these cases, 16, 17 and 18 gave distinct histories of movable kidney existing before the accident, and can therefore be excluded. They are:

CASE 16.—Mrs. B., aged 34, married, was thrown out of a carriage and the carriage wheel passed over her right hip. She had chronic heart disease, lacerations of the cervix and the perineum, and double movable kidneys, right to the third degree, left to the first degree, all dating before the accident.

CASE 17.—Mrs. H., aged 40, a widow, fell while getting off a car, striking her left hip. The right kidney was found movable to the second degree. Characteristic body form present. She had felt a lump (kidney) in the right side from before the accident.

CASE 18.—Miss N., aged 26, fell in a sitting position in getting on a car. Her injury did not incapacitate her. Double movable kidneys, the right to the second degree, and the left to the first degree. The symptoms dated back long before the accident. Characteristic body form found.

CASE 19.—Mrs. B., aged 30, married, was alighting from a car when it started. She held on to the hand rail, then fell on her back. She was in bed six weeks and asserted that her uterus had been displaced, but the physician had corrected same. She was a thin, emaciated subject with pulmonary tuberculosis. The uterus was in good position. Right kidney movable first degree; there were no symptoms.

CASE 20.—Mrs. H., aged 50, married, was thrown off a seat by the car starting and struck her left knee, side and shoulder. Both kidneys were distinctly movable and the left one tender. The nature of the injury was such that it could not possibly have produced double movable kidneys, although it may have added to the tenderness of the left one.

The remaining 21 cases were examined from six months to three years after the accident.

CASE 21.—Miss R., aged 22, was standing when the car started, causing her to fall against the stove, then against the knees of sitting passengers. She bruised her right knee, hip and shins. After riding several miles home, she was in bed one month. She was examined 6 months after the accident. She asserted that she had a great number of nervous symptoms. She was tall and slender and had the characteristic body form and a very movable right kidney. A retroverted uterus was found, also inflammation and thickening of right tube and ovary with considerable leucorrhea from infection. The injury was not severe, but the patient was a hysterical neurasthenic.

CASE 22.—Mrs. S., aged 28, fell from a car by reason of a collision with a wagon. She bruised her right hip and had hemorrhage from the womb and was in bed ten days. She was a nervous patient, with a long history of irregular menstruation, frequent urination, backache, etc. She showed the characteristic body form and had a tender right kidney, movable to the third degree. An enlarged, tender, prolapsed right ovary and a laceration of the cervix were also found. She had two children, aged 6 and 3½ years.

CASE 23.—Miss K., aged 24, struck left knee against seat in getting on a car, but did not fall. She developed marked symptoms of hysteria. There was no possible connection between the injury and a very movable right kidney.

CASE 24.—Miss S., aged 20, was thrown against the door frame in attempting to get out of the car. Her real injury was slight, and she was more frightened than hurt. She gave a history of repeated attacks of Dietl's crises with vomiting for some years before the accident. They were called "bilious attacks." These attacks continued after the accident and were supposed to be due to an appendicitis produced by the accident. Six months after the accident the appendix was removed but without benefit, as attacks still continued. The sensitive movable right kidney had not been discovered. She had a typical body form.

CASE 25.—Mrs. H., aged 36, was thrown from a car while rounding a curve and injured her right knee, which laid her up three months. She said her right kidney was dislocated by a fall from a car six months previously. Examination showed the uterus retroverted, a laceration of the cervix, the right kidney movable to the first degree. No relation existed between the injury and the movable kidney.

CASE 26.—Mrs. S., aged 35, in getting off a car was swung around, striking her left side against an upright. She did not fall and did not think she was hurt. Examination showed a lateral curvature of the spine, the characteristic contracted middle zone and the right kidney movable to the third degree; left one movable to the first degree. She complained of numerous symptoms characteristic of neurasthenia. The movable kidney was undoubtedly of long standing.

CASE 27.—Mrs. P., aged 32, was shaken up somewhat by the car jumping the track. She said that she did not think at first that she was injured. The next day pains developed in the abdomen and back. Examination showed a heavily

loaded colon from constipation. The right kidney was freely movable. There was the typical body form. The real injury here was too slight to have had any effect on the kidney.

CASE 28.—Mrs. —, aged 55, fell in getting off a car and struck on her hip and back. She was in bed two months with pain in hip, back and shoulder. The right kidney was movable to the first degree with a positive index; the mobility was evidently of long standing.

CASE 29.—Miss R., aged 26, fell from a car alighting on her feet, then on left side. She was in bed nine weeks with pain in the spine and the hip. She was a frail, slender woman, very constipated, had marked dysmenorrhea and general nervous symptoms. Her right kidney was movable to the second degree.

CASE 30.—Miss A., aged 29, was thrown down while getting on a car and fractured her left humerus at about the center. She has lateral curvature of the spine with slightly deformed chest. Both kidneys were movable, the left worse than the right. There were no symptoms of injury to the kidneys.

CASE 31.— Mrs. D., aged 27, when a car jumped the track, was thrown to the floor, then struck back against car seat. Patient was in bed two and a half months with pain in back, back of head and neck, and left side of the abdomen. She had dysmenorrhea, never had been pregnant. The right kidney was found movable to the second degree. There were no symptoms referable to the kidney.

CASE 32.—Miss R., aged 16, was knocked down by a car and rolled under the fender. She was able to get up and walk to the station after the accident. Her physician said that the uterus was displaced by the accident and he replaced it. At examination the uterus was found in normal position. The right kidney was movable to the second degree and the characteristic body form was present. There were no symptoms of injury to the kidney.

CASE 33.—Miss H., aged 21, was thrown from a bicycle and fractured her left arm near the elbow, bruised her back and leg and was rendered unconscious. She was in bed three weeks. Examination showed a lateral curvature of the spine and a right kidney movable to the first degree, positive index. There were no symptoms referable to the kidney at any time.

CASE 34.—Mrs. R., aged 37, was thrown forward while alighting from a car and cut her left leg. She asserted that exophthalmic goiter resulted from the accident. She has had one child since. Examination showed an old adenomatous goiter, which she had had for some years. There were no symptoms of the goiter. The right kidney was movable to the second degree. There were no symptoms of injury to the kidney. Typical body form was found.

CASE 35.—Miss W., aged 30, fell down and was struck by a car in the region of the anus. She asserted she was laid up eight months with rectal trouble and during that time was operated on for hemorrhoids. Two months after the operation she had a perirectal abscess. Examination showed a right movable kidney and characteristic body form. The case is very suspicious.

CASE 36.—Mrs. M., aged 41, was thrown to the ground, striking on her right side. She was in bed two weeks on account of a bruise to her right knee. elbow and side of body over the lower ribs. She had had ten children. Her abdomen was loose and pendulous. The right kidney was movable to the second degree; left kidney first degree. She had frequently noticed a swelling or a tumor in her right side, which disappeared again; evidently the right movable kidney and certainly of long standing.

CASE 37.—Miss A., aged 22, received a fright in a collision and claims she was stepped on. Her real injury was slight, but she developed hysterical spells. The right kidney was movable to the first degree.

CASE 38.—Mrs. H., aged 26, in a collision, was thrown from her seat and said that passengers stepped on her. She was able to get up and walk home without difficulty. She miscarried at the third month and was in bed six weeks complaining of nervous symptoms. Double movable kidneys were found, but there were no symptoms of injury to them.

CASE 39.—Miss G., aged 20, jumped from a car and fell. She had a very movable right kidney with Dietl's crises—certainly antedating the injury.

CASE 40.—Mrs. R., aged 38, was struck by a car and knocked down. She miscarried at the second month. She had had seven children and one miscarriage. She showed on examination very marked visceral ptosis with a movable right kidney, third degree, which was undoubtedly of long standing.

CASE 41.—Mrs. S., aged 37, was struck by a car and knocked down, bruising her right arm. She had six children. Examination showed a very hysterical patient with retroversion of the uterus, a laceration of the perineum and a movable right kidney.

After carefully analyzing these 41 cases, taking into account the injuries and the manner in which they were produced, the symptoms, the examination of the patients, etc., one is forced to the conclusion that not in a single case is it at all certain, nor even probable, that the kidney was made movable by the accident. It should not be concluded, however, that a kidney already movable may not be injured by violence, as well as one that is normally fixed, or that symptoms connected with a movable kidney may not be aggravated by injury, but the most probable explanation of many of these cases is that the injury but made manifest or called attention to a movable kidney which had existed for some time without giving rise to symptoms or without being recognized. It is a well-known fact that many women have movable kidneys for years without experiencing any special symptoms connected thereto, and that symptoms may appear after a slight injury, as a fall, or after a spell of sickness or unusual fatigue, or even after a nervous shock. I recently had a case illustrating this:

A young married lady of 26 years was hastening to catch a train. She tripped lightly and fell, but did not hurt herself in the least. She caught her train and while making the journey a collision occurred. She received no physical injury whatever, but was considerably frightened. She was about two months pregnant at the time. A few hours later she had an attack of pain in the right side of the abdomen. During the next year and a half she had several similar attacks at irregular intervals of a few weeks. Examination disclosed a movable right kidney, to which her attacks were undoubtedly due; but it would be ridiculous to say that the collision or fright was in any way responsible for the movable kidney.

From a careful study of the subject, I present the following conclusions:

1. Movable kidneys occur in women with a particular body form, and practically all women with this body form have movable kidneys of greater or less degree.

2. Movable kidney is not produced immediately, but requires time for its development.

3. While it is possible to injure, crush or suddenly displace by violence a normally fixed kidney, such displacement is always accompanied by laceration of the perirenal tissues, which is manifested by distinct local and general symptoms.

4. Severe injuries involving the kidney or perirenal tissues are seldom or never followed by movable kidneys. Sterns says he has not been able to find a single case in the literature where such a result occurred.

5. A movable kidney is never the immediate result of a single trauma.

Additions to Medical Knowledge.—I have always thought (and not without reason) that to have published for the benefit of afflicted mortals any certain method of subduing even the slightest disease was a matter of greater felicity than the riches of a Tantalus or a Cresus. I have called it a matter of greater felicity; I now call it a matter of greater goodness and of greater wisdom.—*Sydenham.*

THE NERVOUS PHENOMENA ASSOCIATED WITH MOVABLE KIDNEY.*

WHARTON SINKLER, M.D.
PHILADELPHIA.

It is only within a comparatively recent period that the attention of the profession has been directed to the frequent occurrence of movable or floating kidney, and it is within a still more recent time that the importance of the symptoms arising from this condition has been appreciated. The frequency of movable kidney is a point on which there has been wide diversity of opinion. All authorities agree that movable kidney is much more common in women than in men, and it is also agreed that it most frequently occurs between the ages of 25 and 40 years, and is rarely found in girls before puberty. It is also most common in women who have been pregnant. Some writers state that this condition of the kidneys is found in 25 per cent. of women who are examined for pelvic, dyspeptic or other troubles, while others regard the condition as comparatively rare. Franks[1] insists on a distinction between floating kidney and movable kidney. The former, he says, is very rare and is a pathologic curiosity, while the latter is common. Floating kidney is a congenital condition and the organ is freely movable in the cavity of the abdomen, it is surrounded by peritoneum and is possessed of a mesonephron. Movable kidney is an acquired condition and the organ is mobile behind the peritoneum.

When looked for in the cadaver, the kidney is not often found displaced, and this is probably due to postmortem conditions, the kidney having a tendency to settle into its normal position, and the fatty capsule surrounding the organ becomes solidified and helps to hold it there. Epstein states that movable kidney was found only five times in 3,658 postmortems, and Landau in an examination of hospital records from 1870 to 1879 found reports of only 4 cases out of 6,999. On the other hand, Lindner[2] asserts that in his experience, one out of every five women has a movable kidney, and Mathieu out of 306 women examined in hospitals, found movable kidney in 85, or 25 per cent.

There is no doubt that a kidney which is displaced to only a slight extent is overlooked, and in the detection of a movable kidney, much depends on the manner in which the examination is made. It is the experience of every one to have found at one examination that the kidney was so much out of place that its whole outline could be readily traced, while on the next occasion it may have been impossible to feel the organ at all. Lindner gives the following as his method of examination for displaced kidney: He stands at the right side of the recumbent patient, places his right hand against the anterior abdominal wall and then presses the left against the back of the lumbar region so as to push the kidney forward. The patient is then placed on her right side with the knees drawn up; by sharply shaking the body, the kidney, if movable, will fall forward. He says that frequent examinations are sometimes necessary to detect the abnormality.

Noble[3] declares that an examination of a patient lying down is a most unreliable way for determining the presence of movable kidney, and he believes that this condition is frequently overlooked if the examination is not made when the patient is standing. His method is as follows: "The patient's clothing should be loosened, all bands about the waist unfastened and the skirts supported by a nurse or assistant so that the patient will not be embarrassed with the fear that her clothing will fall off. She should then stand before a table or desk of convenient height, about thirty inches, with the examiner seated on her right. The patient then bends forward from the hips, and supports some of her weight by resting her hands on the table. She is directed to respire regularly, care being taken to relax herself thoroughly during the expiration. The examiner's left hand is placed against the lumbar region posteriorly and his right hand in a corresponding position in front of the kidney. By a conjoint manipulation, the region between the two hands can be carefully palpated and if present, the kidney is easily recognized." The points to be looked after are the shape and size of the kidney and the fact that it can be readily displaced upward beneath the margin of the ribs, and that it will return to its former location as soon as the examiner's hands no longer support it. When the kidney is compressed, as a general rule, the patient complains of tenderness or pain of a peculiar character, and often makes the statement that the pain causes her to feel faint and somewhat nauseated. In some cases the manipulation will be more successful in the knee-elbow position.

The causes of displaced kidney have been variously assigned to falls, pregnancies and tight lacing, but it is probable that these conditions are only indirectly causative, as there must be some predisposition to displacement in order to effect a marked change in the position of the organ. Probably the most common predisposing cause is the lack or loss of adipose tissue. It is undoubtedly true that movable kidney is usually seen in women who are thin or emaciated. Possibly one reason for its more frequent detection in thin women is that in them it is easy to palpate the whole abdomen, while in stout women the difficulties are great, but it is no doubt true that movable kidney does not occur so frequently in stout women as in thin.

The kidney has no proper ligaments, but is embedded in a thick cushion of fat which aids in keeping the kidney in place and there is also a large amount of connective tissue which binds it to the loin behind and to the abdominal viscera in front. Anything which causes absorption of the fat will necessarily allow greater mobility to the kidney. The right kidney is much more frequently displaced than the left, although occasionally it is found that both kidneys are displaced. Schutze found in 73 cases the right kidney displaced 65 times—the left 18 and in both 14 times. Noble says that he has never seen a case in which the left kidney was displaced independently of the right.

The symptoms of movable kidney are for the great part reflex in character, but there are also those which are local or due to mechanical action. The principal symptoms connected with displaced kidney are pain and dyspeptic and neurasthenic disorders. It is interesting to note that the symptoms are by no means in proportion to the degree of displacement of the organ. It frequently occurs that in cases where the displacement is only slight, the reflex symptoms are most marked. Noble has called attention to this and also to the fact that in this it is analogous to pelvic disorders. He thinks that the explanation is that in extreme displacement the

* Read at the Fifty-fourth Annual Session of the American Medical Association, in the Section on Nervous and Mental Diseases, and approved for publication by the Executive Committee: Drs. Richard Dewey, H. A. Tomlinson and F. W. Langdon.

1. Twentieth Century Practice of Medicine, vol. ix, p. 781.
2. Sajous' Annual, 1889, vol. 1. G., p. 21.
3. Gaillard's Med. Jour., 1895, vol. lxi, pp. 59, 65.

nerves become overstretched and the circulation has had time to adjust itself to the changed condition.

The degree of pain varies from a dull aching to acute lancinating pain. It is usually referred directly to the region of the kidney and is more or less constant. In many cases it is uncomfortable or painful for the patient to lie on the side opposite the displaced organ. If there should be a twist or kink of any kind in the ureter, this will give rise to intense pain and eventually to hydronephrosis. Should complete rotation of the kidney occur, not only is the ureter compressed, but the renal vessels and nerves are also involved. The result is agonizing pain, with collapse, nausea, cold sweats and scanty urination. In short, most of the symptoms of renal colic are present.

Neuralgic pains in different parts of the body are complained of. Irritable bladder is common and so also is pain in this organ, which begins in the kidney and passes down the ureter into the bladder. Dysmenorrhea is frequently associated with movable kidney, and there are also symptoms referred to the ovaries and bladder of a dragging character or weight, which are really due to a displaced kidney. There are frequent disturbances of the liver and gall bladder as a result of mechanical dragging by the kidney and symptoms closely resembling those of gallstones are not unusual in connection with movable kidney. Dyspeptic symptoms are almost constantly met with in cases of displaced kidney. They may vary in degree and kind from slight indigestion and flatulence to intense nausea and pain. In connection with gastric disturbances are found palpitation of the heart and other disturbances in the action of this organ.

Intestinal disorders are also common. In some cases there is marked mucous colitis with its distressing local and general symptoms. What are popularly called bilious attacks frequently occur in patients with movable kidney. In these attacks there are headache and vomiting of large quantities of bile stained mucus. The gastric symptoms have been attributed by one writer to the direction of the displaced kidney and the pressure of this organ on the stomach, but this is hardly a satisfactory solution of the case. It is more likely that the gastro-intestinal symptoms are reflex rather than mechanical.

A recent writer, Dr. Sherman Thompson Brown,[4] has reported two instructive cases of pancreatic diabetes, which he believes were due to misplaced right kidney. In both cases nephropexy was performed. Both patients made an uninterrupted recovery and from the time of the operation no sugar was present in the urine in either case. In the interesting article which this writer has presented, he goes fully into the anatomy of the pancreas, duodenum and kidney. He explains the intestinal and pancreatic disturbances in displaced kidney by the pulling upon the duodenum and the colon with the duodenum where it crosses the kidney, and the pressure of the misplaced organ. In his cases, he believes that the glycosuria was due to dragging on the pancreas by the kidney.

Edebohls[5] believes that movable or displaced right kidney is directly responsible for almost every case of appendicitis. He, as is well known, is a strong advocate for operations to anchor the kidney. It would seem, therefore, that movable right kidney is held responsible for nearly all the ills to which flesh is heir.

The most common symptoms associated with movable kidney are disorders of the nervous system, such as hysteria, neurasthenia and mental depression. It must be borne in mind, however, that at least 50 per cent. of the cases of movable kidney present no symptoms whatever, and that, therefore, we can not expect to find in every neurasthenic woman a displaced kidney. At the same time there is such marked causative relation between movable kidney and neurasthenia that it behooves us to examine every woman presenting neurasthenic or hysteria symptoms, for the position of the kidneys. It is not necessarily the case that there is severe pain complained of in connection with the nervous systems, for frequently it is found that a neurasthenic woman has not experienced any pain or discomfort in the region of the kidney, nor has she been aware of any malposition of the organ.

Probably the most constant nervous disorder in a patient with displaced kidney is neurasthenia. Such patients are thin and in addition to general neurasthenic symptoms, suffer from much gastric disorder. There are in some cases, attacks of severe epigastric pain with retching like the gastric crises of tabes and often there is gastric pain which comes with regularity one or two hours after eating and large quantities of gas are belched up simulating gastric ulcer. The usual remedies for indigestion and flatulence afford little or no relief. Some patients find that lying down and kneading the right side gives ease. Bloating from distention of the bowels with gas is a common symptom, and this is frequently accompanied with palpitation of the heart and pain in the precordia. These patients also have more or less pain in the region of the affected kidney, which is generally of a dull aching character, and is often attributed to intestinal disturbances. The patient sleeps badly and the sleep is broken and disturbed by dreams. Any form of exercise, even walking or driving, is liable to cause pain and aching in the right hypochondrium and considerable exhaustion. Patients with movable kidney are also extremely nervous and irritable, and are often in a condition which makes them not only uncomfortable to themselves, but a burden to their friends. In some cases, the various manifestations of hysteria may be presented. I recall one patient whose right kidney was so much displaced that it could be readily outlined in the region of the umbilicus, who had severe hysterical seizures in which she became unconscious and raved.

There are various reflex hysterical disturbances met with in movable kidney. Of course, there may be only an accidental association between these conditions, but from the fact that after an operation for fixation of the kidney these symptoms disappear, it is evident that there is more than a coincidence between the symptoms.

Hypochondriasis and mild mental disturbances like melancholia are sometimes associated with movable kidney, but these conditions occur only in cases of long standing.

These nervous phenomena rarely occur in men, but when they are met with in that sex they are very intense. The treatment of movable kidney is palliative or radical. In a certain proportion of cases, the application of abdominal belts with properly adjusted pads seems to afford relief, but in the majority of instances the use of any kind of apparatus is entirely unsatisfactory, as it is most difficult to get a belt which can be made to fit accurately. Many cases in which the amount of displacement is moderate in degree, are greatly benefited by the rest treatment, and even cases in which there is a considerable displacement of the organ are distinctly benefited by such a plan of treatment. Every case of dis-

4. Phila. Med. Jour., April 4, 1903, p. 594.
5. Amer. Jour. of Obstet., 1895, vol. xxx, p. 161.

placed kidney should have the benefit of systematic and intelligently directed rest treatment before resorting to operation. All the procedures connected with the rest treatment tend to benefit cases with movable kidney. As long as a patient is on her back the kidney remains in a normal position. By improving the general nutrition of the body, the weight is increased, and this will add to the deposit of fat in all the tissues and restore that which has been lost by absorption from the envelope of the kidney, and thus secure it in its proper condition.

In addition to these mechanical influences from rest treatment, the isolation, regimen and moral influences which are brought to bear on the patient, relieve the nervous and neurasthenic symptoms which are present, in almost every instance.

In cases in which there is true floating kidney or much displacement of the organ, and in which the rest treatment has been faithfully tried without benefit, operation should be resorted to. There are also cases in which, for various reasons, it may be undesirable to adopt rest treatment, and in these, nephrorrhaphy may be resorted to at once. The operation has been performed in various ways by different operators. The five principal methods are as follows:

1 The sutures may be passed through the fatty capsule alone.

2. They may be passed through the fibrous capsule of the kidney.

3. They may be passed through the substance of the kidney itself.

4. The capsule may be split and dissected off and this stitched to the lumbar muscles.

5. The substitution of gauze packing for sutures to hold the kidney in place until the formation of permanent adhesion of the kidney in its new position, the wound being left open to heal by granulation.

The object in all of these is to fix the kidney in the loin. The operation has now been performed a great number of times with marked success as to retaining the organ in position. The mortality is exceedingly small. In 134 cases collected by Keen,[6] there were four deaths, giving a death rate of 2.98 per cent. The experience of most operators has been that the kidney remains in position after it has once been fixed by operation. Edebohls states that in 193 operations upon 186 patients, in none of the cases did he find the kidney misplaced on subsequent examination. Henry Morris states that in 98 operations for movable kidney, he has not reoperated on a single patient.

The ultimate results of nephrorrhaphy as regards the symptoms, depend to a considerable extent on the nature of the case. The pain, weight and dragging is almost invariably relieved by an operation. The immediate effect on disorders of the digestive system is not always satisfactory and it often is a considerable length of time after the operation before these symptoms are relieved. Flatulent dyspepsia and constipation often remain for a long time, and the same may be said of the nervous phenomena. Few cases are immediately relieved of neurasthenic and hysteric symptoms immediately after operation, and it is not reasonable to expect that such symptoms would disappear at once. As a rule, they have lasted for a long time, and the neurasthenic and hysteric condition has become established in the individual. We cannot, therefore, expect that these symptoms will be relieved without suitable treatment being pursued for a reasonable length of time. It is, in operations for movable kidney, just as it is in operations for ovarian disease in patients who have become neurasthenic. The cause of the trouble may have been removed, but the disease which has been induced does not disappear without proper treatment.

I will only relate two cases to illustrate what has been dwelt on in the foregoing remarks.

CASE 1.—Mrs. A., aged 40, mother of four children, has for several years suffered from a number of symptoms of neurasthenia. She has had flatulent dyspepsia and suffered from constipation. She has been very nervous and has become unable to perform her duties at home. She has lost much flesh and is far below her normal weight. The right kidney was found to be markedly displaced, and could be readily outlined. There is apparently little local pain. She was treated systematically by the rest cure, and gained flesh and lost her neurasthenic symptoms. Fifteen years later she was seen, and stated that she remained in excellent health.

CASE 2.—Mrs. B., aged 25, has for several years suffered from severe attacks of bilious vomiting associated with headaches and pain in the right hypochondrium. She has been neurasthenic, irritable and emotional. She has constant dragging pain in the right side of the abdomen, most marked just below the margin of the ribs. She had frequent attacks of mucous enteritis. The right kidney was found to be movable and readily outlined. The patient was thin but not anemic. A course of rest treatment was followed by improvement in her general symptoms, but after a few months she had almost as much pain and suffered from as frequent attacks of bilious vomiting as before. In September, 1902, she was operated on by Dr. John B. Deaver and the kidney was fixed in position. She made a satisfactory recovery from the operation and all of her symptoms have gradually disappeared. She has gained flesh and has comparatively little trouble with her digestion, and while not entirely free from pain, has so much less that it gives her but little inconvenience. She has gained markedly in weight.

DISCUSSION.

DR. A. P. OHLMACHER, Gallipolis, Ohio—Dr. Sinkler has referred to the difference between the figures of the pathologist and those of the clinician as to the frequency with which movable kidney is met. This discrepancy is, perhaps, partly due to the fact that it is not the routine custom to look for this anomaly in making an autopsy. The displacement is usually best made out with the body in the recumbent position, but if the autopsy is not made immediately after death, the fixation of the tissues tends to anchor the kidney, as well as the other intraperitoneal contents. If one will take the pains to grasp the kidney in its peritoneal covering, it will frequently be found that the range of movement varies greatly, and in this way one can sometimes detect a movable kidney. My attention has frequently been called to this in cases where the mesentery was unusually long and associated with a displaced stomach and colon, and on examining the kidney it would be found in its normal position, but it could be very readily drawn out and sometimes displaced for a considerable distance. I was rather surprised that Dr. Sinkler has laid no stress on the association of movable kidney with movability of other abdominal organs, that is, to a splanchnoptosis. This association is so common that I am sure it deserves some consideration. The digestive symptoms to which he referred are frequently the result of an associated gastroptosis, and are not referable to the kidney condition proper. In a like way the intestinal symptoms are often referable to displacement of the colon.

DR. R. C. MOORE, Omaha—The number of cases of movable kidney that we come across in general practice is astonishing, and it has become my custom when I am called to see a patient who has any symptoms pointing to the abdomen, to invariably look for floating kidney. The general symptoms, as Dr. Sinkler has described them, do not point to any disorder of the pelvic organs, but more especially to the gastro-intestinal tract. The author also referred to the connection of appendicitis with this

6 Trans. **Amer. Surg. Assn., 1890.**

trouble. This form of appendicitis comes under the head of colic of the appendix, and an operation on the movable kidney will not cure the trouble in the appendix. After the kidney is anchored, it becomes necessary to perform a second operation on the appendix. These cases of appendicitis are non-suppurative in character at the onset, but there is a constant danger that infection may take place. In examining for movable kidney, the upright position allows it to fall forward, but it is often very difficult to map it out on account of the rigidity of the abdominal walls. My custom is to have the patient sit on a chair and bend forward so that the abdominal muscles become relaxed. If the kidney is displaced, it can usually be made out by examining in this position.

DR. J. L. MILLER, Chicago—In quite a large percentage of cases of movable kidney of the second or third degree we also find gastroptosis. The latter condition does not always give rise to gastric symptoms. Many of these patients have shown marked improvement on the application of a suitable bandage; in others, an operation was necessary. Before we can say that these patients are cured, it is necessary to keep them under observation for a long time, as relapses are not uncommon. The neurasthenic symptoms will be apt to return even if the kidney has been restored to its proper position. The beneficial results of the treatment, as far as the nervous symptoms are concerned, are, I believe, largely due to suggestion.

DR. A. R. ELLIOTT, Chicago—I have been astonished at the frequency with which I have found gastroptosis and enteroptosis associated with movable kidney. These patients sometimes fall into the hands of the gynecologist, who may, perhaps, find and repair an old rupture of the perineum without relieving any of the patient's abdominal symptoms, which are the result of an abdominal ptosis. A satisfactory abdominal support and measures directed toward a proper regulation of the digestive functions with promotion of the general muscular tone, give the best results in these cases.

DR. A. C. CROFTAN, Chicago—I think it is difficult to determine whether floating kidney is ever the cause of neurasthenic symptoms. I have never seen such a patient cured by the replacement of the kidney alone. There is usually in these cases general abdominal ptosis, and often associated with this condition is a loose floating twelfth rib. Whether the neurasthenia and the relaxation of all the abdominal supports are both effects of the same cause, or whether the latter determines the former, is often difficult to say. Theoretically, one might imagine that splanchnoptosis, with the resulting derangements of function, might cause certain vague general symptoms that can be conveniently included under the gaping category of neurasthenia; sympathetic irritation may also possibly be incriminated. The anchoring of a loose kidney or uterus, however, can hardly be expected to cure the patient. I certainly never hesitate to send my neurasthenics to the abdominal surgeon even if the kidneys were loose.

DR. F. SAVARY PEARCE, Philadelphia—I believe that in a great many cases of floating kidney, associated with general splanchnoptosis, the whole process is the result of depressed vitality in a neuropathic subject. The treatment should be directed first along neurologic lines—to repair the nervous system, and when the patient's general condition is improved, it is certainly advisable to put the organs back into their proper places. As to the gastro-intestinal symptoms being necessarily due to an associated gastroptosis or enteroptosis, I am not willing to subscribe to that theory, because I have seen two cases of undoubted floating kidney with marked gastro-intestinal symptoms in which there was no displacement of the stomach or bowels. The gastric symptoms, under such circumstances, are probably at least partially of reflex origin, or they may be the result of a nervous dyspepsia. The ideal treatment is to remedy the nervous condition. I have never found much benefit from the use of a belt.

The ethics of the American Medical Association do not interfere with any physician in the exercise of good business sense, and they are seldom criticised except by those who wish to dodge.—*Alkaloidal Clinic.*

A CONSIDERATION OF THE NEUROSES OF STATUS LYMPHATICUS.*

A. P. OHLMACHER, M.D.
GALLIPOLIS, OHIO.

Status lymphaticus, otherwise known as the lymphatic constitution, lymphatic diathesis, lymphatism, etc., is a so-called constitutional disorder, characterized by a persistence or hyperplasia of the thymus, general lymphadenoid hyperplasia, frequently associated with cardiac and arterial hypoplasia, and evidences of rachitis. The principal morbid anatomic features of status lymphaticus are a persistent or hypertrophic thymus, general or regional lymphadenoid hyperplasia including the lymphoid elements of the spleen, hypoplasia of the arteries and heart, very often with the osseous changes of rachitis. Occasional or accessory features are a thick skin, edema of the skin, lungs or brain, hypertrophic thyroid, hypertrophy of the brain, hypoplasia of the sexual organs, and lymphocytosis. A pronounced general active hyperemia is usually discovered in lymphatic individuals dying suddenly.

That there is a close morbid anatomic association between status lymphaticus and rickets has been abundantly proven, particularly in the case of lymphatic infants. Still we are not at present in a position to say that all cases of status lymphaticus are associated anatomically with the rachitic dyscrasia, nor do all cases of rickets exhibit the evidences of lymphatism, though its coincidence with enlarged spleen and hyperplasia of the mesenteric nodes is well known. In infants dying in the lymphatic state a mild grade of craniotabes, the rosary, curvature of the long bones or spine, and enlarged epiphyses have been manifested as rachitic osseous changes; and in older children or adults several instances of rachitic spinal curvature, pigeon breast, narrow pelvis, and curvature of long bones have been found.

It will not be germane to our present purpose to enter into details concerning the morbid anatomy of the lymphatic state, and your attention is therefore invited to several peculiar clinical manifestations of status lymphaticus which I have ventured to class as its neuroses. The first of these is sudden death, which, because of its morbid anatomic association, shall be designated thymic or lymphatic sudden death. An abrupt lethal ending in victims of lymphatism is not an uncommon phenomenon, both in infants and young adults. It occurs under various circumstances, as by a sinking spell with or without convulsions in the presence of spectators, during sleep ("found dead in bed"), during a bath or while swimming, in surgical narcosis, or during the performance of some minor operation as the removal of the tonsils or adenoids, extraction of teeth, injection of curative sera, or following certain hydrotherapeutic measures. This phase of our subject is discussed in detail by such writers as Grawitz, Paltauf, Pott, Nordmann, Kundrat, Escherich, Gallatti, Ewing, Blake and others.

That lymphatic sudden death should be looked on as an abruptly fatal neurosis seems entirely permissible, and the term "Nervenschlag," used by the Germans to describe its mode of onset, is equally suggestive. Moreover, in cases that have come under accurate observation, convulsive phenomena have been described as ushering in the fatal event, and some of the accounts recall to

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* Read at the Fifty-fourth Annual Session of the American Medical Association, in the Section on Nervous and Mental Diseases, and approved for publication by the Executive Committee: Drs. Richard Dewey, H. A. Tomlinson and F. W. Langdon.

one's mind the similarity between the abrupt assault of an attack of major epilepsy and the sudden spasm of lymphatic sudden death.

Infantile eclampsia is, to my mind, another neurosis whose anatomic affinity with status lymphaticus will be more fully elaborated as our knolwedge increases. The association of teething fits and rickets is generally conceded, and in a few instances in which search was made with that particular end in view, status lymphaticus was disclosed at autopsy. Personally my experience is limited to two cases, in one of which a six months' infant died during general convulsions of the kind usually designated "teething fits," and in the fresh material from the autopsy sent to the laboratory the enlarged thymus and lymphadenoid hyperplasia of status lymphaticus were readily disclosed. In another case of a young infant dying in convulsions, the formalin-preserved specimens which came into my possession for study revealed the changes of the lymphatic state in a degree even more striking.

Closely united in clinical analogy with the eclampsia of infancy are spasm of the glottis (laryngismus stridulus, etc.), and infantile tetany (carpo-pedal spasm). These neuroses have repeatedly been associated with the rachitic dyscrasia and, more recently, it has been found that the anomalies of status lymphaticus could be disclosed on proper autopsic examination. Without reviewing the familiar clinical characteristics of these affections, therefore, it becomes of interest for us, in the present connection, to recall that each of the three neuroses—eclampsia, glottic spasm and infantile tetany—are in some way related to lymphatism, as has been pointed out, especially in the papers by Pott and Escherich.

In the course of my studies in the pathology of epilepsy pursued at the Ohio Hospital for Epileptics I have become impressed with the frequent coincidence of idiopathic epilepsy and status lymphaticus; and it seems to me justifiable to assert that idiopathic major epilepsy is a neurosis of the lymphatic state in the same relationship that lymphatic sudden death, infantile eclampsia, tetany, and spasm of the glottis are so considered. Epilepsy and teething fits have long been regarded as sustaining a clinical affinity, and the same has been asserted of epilepsy and tetany, glottic spasm, and (by my own endeavors) lymphatic sudden death. Moreover, on purely clinical grounds, epilepsy has been classed as a neurosis of rickets. In view of these considerations, therefore, it may be asserted with reasonable assurance that these neuroses exhibit both a clinical and morbid anatomic kinship and that their anatomic basis is the lymphatic or rachitic dyscrasia.

As to the morbid physiology of this interesting group of nervous diseases and the attempt to reconcile them with status lymphaticus as the morbid anatomic basis, data are still meager. The German writers have recognized the neuropathic element in these affections, whence the term "Nervenschlag" to describe the attacks. Sudden death is regarded as a reflex cardiac paralysis, the increased susceptibility of the heart to various forms of irritation being a part of the lowered vital resistance incidental to the constitutional disorder. Escherich considers a latent irritability of the central nervous system to be characteristic of the lymphatic constitution, causing reactions in the form of spasmodic conditions in various parts of the body in response to trifling stimuli. He would regard the constitutional disorder as the expression of an incomplete or perverted metabolism, that is, as a dyscrasia or chronic intoxication comparable with Basedow's disease or myxedema.

Gallatti directs attention to a peculiarity of status lymphaticus which, in my opinion, is a factor of importance in explaining some of the clinical phenomena, viz., the peculiar predisposition to edema. This, as Gallatti asserts, is shown by the pasty condition of the skin, by the tendency to eczema, and by the occurrence of edema of the brain. I would add, from my observation on lymphatic epileptics dying abruptly in a single seizure or from rapid status epilepticus, edema of the lungs as another one of the manifestations; an observation already made by Kundrat in a case of sudden death during chloroform anesthesia, by Langerhans in the case of his son's sudden death after a prophylactic antitoxin injection, and by Paltauf in at least one of his cases of sudden death. Gallatti holds that slight factors like autointoxications of various kinds may incite this tendency to edema into activity. Piedecocq, in his belief that sudden death in infants with hyperplastic thymus is due to increased intracranial pressure resulting in compression of the medulla, is evidently on the tack taken by Gallatti, though he wishes to ascribe the increased cerebral pressure to compression of the great vessels in the neck caused by a backward flexion of the head aggravating the pressure already exerted by an enlarged thymus.

Whatever its mechanism, I am, from my observation on lymphatic epileptics and my reflection on these studies, strongly disposed to the belief that a periodic increase of intracranial pressure acting either on the exterior or interior of the brain, or on both portions simultaneously, and manifesting itself as a result of the tendency to edema characteristic of status lymphaticus, is a directly provocative factor of such neuroses as spasm of the glottis, tetany, infantile eclampsia, epilepsy, and the various forms of sudden death incidental to the lymphatic state. According to this view the clinical phenomena would depend on the extent and location of the intracranial edema, or, in other words, on the portion of the encephalon particularly subjected to pressure. In event of compression of the external portion of the cerebrum various convulsive disorders of the motor apparatus are provoked; when the balance of pressure becomes so distributed as to raise the intracerebral pressure other severer symptoms occur, ending, in case of sufficient pressure on the floor of the fourth ventricle, in sudden respiratory or cardiac failure. Granting the hypothesis just advanced, we are brought one step nearer the explanation of the modus operandi of several obscure neuroses whose kinship has repeatedly been recognized on purely clinical grounds and whose morbid anatomic association is proved by the establishment of the lymphatic state as a common basis for all. Cheadle's dictum that "laryngismus, tetany, and general convulsions are the positive, comparative and superlative of the convulsive state of childhood," finds support and elaboration.

DISCUSSION.

DR. D. I. WOLFSTEIN, Cincinnati—I am sorry that Dr. Ohlmacher did not mention what criteria at autopsy enabled him to diagnose the status lymphaticus.

DR. A. P. OHLMACHER, Gallipolis, Ohio—The criteria referred to were disclosed with relative uniformity in suitable epileptic subjects at the Ohio Hospital for Epilepsy. It is necessary, in order to find the persistent thymus gland, the enlarged intestinal follicles and the enlarged spleen, that suitable autopsy cases should be selected. These lesions are found in young patients who are the victims of idiopathic epilepsy.

They are not ordinarily found in epileptics who are over thirty years old, or in those who have died of prolonged dementia or exhaustion or of certain acute infections, but only in those who die suddenly, and particularly in those whose nutrition is not materially impaired. The narrow arteries and relatively small heart are common as persistent features even after the patients have reached an advanced age.

DR. H. T. PERSHING, Denver—Can Dr. Ohlmacher give us any information as to the treatment?

DR. H. T. PATRICK, Chicago—I have been more or less familiar with Dr. Ohlmacher's investigations in epilepsy, and I think there is nothing so far to quite warrant the conclusion that the convulsions were caused by edema affecting the surface of the brain. I believe that this is a highly improbable solution of the epileptic paroxysm. Edema does not form instantly: it requires a certain length of time, while the paroxysm is almost instantaneous.

DR. D. I. WOLFSTEIN, Cincinnati—It seems to me very difficult to explain the occurrence of such phenomena as laryngismus stridulus or tetany or the manifestations of rickets on the theory of edema. Other objections to the theory are that this condition does not always occur in those individuals who show pronounced manifestations of rachitis, and that we see cases of prolonged lymphatic edema without the occurrence of convulsions or sudden death. We frequently see it in chronic alcoholics, and in such individuals there must be a certain amount of status lymphaticus and edema of the cortex.

DR. A. P. OHLMACHER—Little has been accomplished in the way of treatment. The extract of the thymus gland has been used, but it has not given sufficiently good results to make it noteworthy. The treatment of the rickets is the prophylactic measure, and is, I believe, the essence of our present hope in the successful treatment of epilepsy. I am confident that Gowers is right in his belief that there is a distinct relationship between epilepsy and rickets, and that the prevention of rickets is one of the most important considerations in the prevention of epilepsy. The theory that the edema has a causative relation to the paroxysms of epilepsy or to laryngismus stridulus or to sudden death, is not original with me. The German authorities have already called attention to the fact, and its analogy to the lightning-like edema of the lungs. We know that epileptics may die in a sudden attack, and the autopsy may reveal a most astonishing condition of edema of the lungs. That edema of the brain might occur just as suddenly is, of course, a possibility, and one that is worthy of consideration. That intracranial pressure occurs in epilepsy is no novel theory. It has been advanced by a number of neurologists. That we may have a sudden increase of intracranial or extracranial pressure seems at least a possible conception.

METHODS OF CONTROLLING HEMORRHAGE OF THE ORAL CAVITY.*

H. E. BELDEN, M.D., D.D.S.
NEW ORLEANS.

I have been asked to read a paper of interest to the medical as well as to the dental profession. The subject of the control of hemorrhage of the oral cavity may not be as important to the general practitioner as to the specialist, still, as the blood is the life fluid of the body, any suggestions to prevent its loss will, I think, be of interest to the profession at large, especially as the pathology and treatment of hemorrhage of the oral cavity do not differ materially from that of hemorrhage generally.

Fortunately, the operator is usually able to control the hemorrhage, but when the hemorrhagic diathesis is met and diseases of the capillary system, such as purpura and conditions associated with jaundice, a much more serious and complicated state of affairs exists.

The pathology of the hemorrhagic diathesis is not perfectly understood, and its actual cause can not always be satisfactorily explained. It is quite evident that the bleeding continues from a lack of harmony between the coagulation time of the blood and the contractility of the vessels.

There is a tube invented by Wright by which the coagulation time of the blood can be determined. The blood is sucked into the tube and its fluidity tested at intervals of less than a minute. The normal time for blood coagulation is from two to four minutes, but in the hemorrhagic diathesis, and in certain diseases, the time is so extended that a clot does not form quickly enough to engage the fibrin and act as a plug in the mouth of the vessels, but on the contrary, coagulating in from six to twenty minutes, the clot forming outside, acts as a vehicle to hold the wounded surfaces apart and facilitates the free oozing of the blood. Therefore, hemorrhage continues from a perverted relation between the constituents of the blood which are necessary to form a clot (fibrin ferment, fibrinogen and paraglobulin) and the contractibility of the circular muscular fibers of the arteries, veins and capillaries.

We know that the vasomotor system of nerves not only acts on the entire vascular system as a whole, but can control the blood to a circumscribed locality. So in the wounds caused by leeches bleeding continues for hours after the removal of the leech. Could this not be explained by the fact that the leech has produced a circumscribed vasomotor paralysis?

I think that an important point in the arrest of hemorrhage is that the physician impress the mind of the patient with his ability to control the hemorrhage, thus overcoming the effect that fear has on the vasomotor centers, as they control the contractility of the muscular coat of the vessels. I have noticed after the extraction of teeth that fear has a tendency to increase the hemorrhage. For example, a recent patient, not of the hemorrhagic diathesis, presented a marked case of surgical fright and after the extraction of a tooth bled profusely. Dr. J. A. Bodine, in a recent clinical lecture, cites a number of cases where death has been caused by fright. He says that the autopsy findings are exactly the same in cases of death from fright as in those from chloroform poisoning, the cause of death in both cases being a vasomotor paralysis; "that is to say, the nervous system lost control over the motor nerve leading to the blood vessels, and especially the veins of the body, and as a consequence the patient bled to death into his own tissue."

Hemorrhage is the escape of blood from its vessels. The simple term hemorrhage is used when the blood passes outside the body. If it escapes within the cavities of the body it is known as internal hemorrhage. When a small quantity of blood is forced or infiltrated into the tissues extravasation is produced. Internal hemorrhage may occur in two different ways: by rupture of the vessels and by diapedesis. In diapedesis the corpuscles of the blood escape into the tissues through the walls of the vessels.

The control of hemorrhage depends on its cause. The cause may be accidental, that is, come from injury or disease, or it may be intentional, as in operations or in the extracting of teeth. The hemorrhage may be arterial, venous or capillary, but is often a combination.

* Read at the Fifty-fourth Annual Session of the American Medical Association, in the Section on Stomatology, and approved for publication by the Executive Committee: Drs. M. L. Rhein, M. H. Fletcher and Wm. E. Walker.

When there is injury to the arteries or large veins ligature is necessary, and when to the smaller veins and capillaries we resort to sutures, compression and styptics.

After the extraction of teeth, prolonged bleeding might occur from the dental artery becoming entangled in the ragged edges of the alveolus and its mouth being held open. In this case the bleeding would be red blood and spurt in jets. A drill run down into the cavity would disentangle the artery and stop the bleeding. In the same way it is possible that a nerve might become entangled. This would cause neuralgia. Relief would respond to the same treatment.

With proper treatment death is seldom a result of hemorrhage of the oral cavity. When it does occur it generally comes from the hemorrhagic diathesis or from accidental puncture to the larger vessels, as the jugular vein and carotid artery, or in cases of cancer and other malignant growths to capillary bleeding from the slough of unhealthy granulations. When the hemorrhage occurs from this cause the general condition of the patient is so serious that death is imminent anyway.

MECHANICAL METHODS.

The treatment of hemorrhage of the oral cavity may be classed under three heads: Mechanical, medicinal and physiological.

The mechanical methods consist of direct application, as plugging or tamponing, compression, ligating the artery, torsion and suturing, position of the patient, etc. As hemorrhage of the oral cavity is usually capillary, compression is often all that is necessary to control it when properly applied.

In this connection I will describe the heroic treatment resorted to with good results by Dr. Fry of Hebron, Neb., of which I lately read in the *Dental Digest*. Tooth extraction was followed by hemorrhage in a patient subject to bleeding. He took an impression of the mouth in modeling compound, when cold, trimmed it to make an appliance that could be worn in the mouth, notching it to receive a strong bandage to be tied over the head. He then made a thin batter of plaster, added a pinch of salt and filled the appliance, putting it at once into the mouth and pressing it into place. When the plaster was set he added the bandage and tied it firmly. The socket had previously been packed with fluid extract of ergot. Immediate relief was given.

MEDICINAL METHODS.

Under the head of medicinal methods of treatment we will consider the drugs applied locally, internally, hypodermically or intravenously. They have a systemic action and a direct action, one or both. In cases where a predisposition to hemorrhage is known or suspected before operating it is well to give systemic treatment of a nature depending on the general condition of the patient.

Among the new remedies which have appeared is calcium chlorid. This is recommended in doses of from 8 to 16 grains every two to four hours in all forms of persistent hemorrhage. It increases the coagulability of the blood, but when used for three days or more consecutively some authorities say it has the opposite effect.

Dr C. E. Vallis,[1] assistant dental surgeon in King's College Hospital, London, observed the case of a woman, aged 25, presenting the hemorrhagic diathesis, in whom the extraction of a tooth was followed by a hemorrhage lasting 36 hours. As the extraction of many carious teeth became necessary because of dyspeptic troubles, Dr. Vallis administered calcium chlorid in weak doses during eight days previous to the operation and extracted every tooth without hemorrhage. Dr. Vallis has since observed another case in which calcium chlorid has given the same satisfactory results. The disagreeable taste of this medicament and the slight tendency to constipation which it induces are the only inconveniences connected with its administration, even after a continuous use during a period of three to four weeks.

The following formula is ascribed to Bertignon:

℞ Crystallized calcium chlorid, 4 grams, or 60 grains.
Syrup of mint ..... 30 grams, or 1 ounce.
Distilled water .....90 grams, or 3 ounces.

Dr. A. J. Ochsner gives a method of treatment in cases of hemophilia which consists of giving albumin in the form of whites of eggs. He says: "When from four to six whites of eggs are given three times daily there seems to be a very definite effect exerted on the clotting properties of the blood of these persons."

Another remedy which is creating general attention as a hemostatic is gelatin. It should be given in large doses, from 100 to 400 grains daily, and can be continued indefinitely. It seems to be contraindicated only in Bright's disease. It is doubtful whether it should be used subcutaneously or intravenously, as cases of tetanus have been reported from its use. We can understand this, for we know that gelatin is a medium used for propagating bacteria, and several authorities give it as their opinion that sterilization destroys its hemostatic properties. When applied locally an antiseptic should always be used in conjunction with it. It is a splendid systemic remedy and the good results consequent on its use are probably due to the nourishment of the vasomotor centers.

M. Marc Laffont and M. Andre Lombard conclude that "whenever some nutritional vice modifies the cryoscopic and other properties of the blood there may be glycosuria, an albuminuria, or a hemorrhage. Whether this syndrome is accompanied or not by an anatomic lesion, in a great majority of instances the lesion is curable if one attacks the cause. Gelatin seems to be the only agent capable of rendering the plasticity of the blood normal when administered in the dose of 225 grains daily. It is a harmless drug, and no contraindication to its use exists, and its administration should be prolonged."

The *Philadelphia Medical Journal* has this to say of adrenalin:

> Generally speaking, adrenalin, when locally applied, is the most powerful astringent and hemostatic known; also a very strong stimulant of the heart. It is non-irritating, non-poisonous and non-cumulative, as far as it has been observed. It is indicated in a condition produced by morphin and opium poisoning. It has produced good results in circulatory failure, in prevention of collapse of anesthesia and allied conditions. It is invaluable in carrying out bloodless operations in nose, ear, eye and throat work. Out of a great number of operations in which it was used, in only a few instances was sloughing after operation reported. The length of time required to control bleeding depends on its strength.

I have lately been experimenting with adrenalin in a small way. I have used it with good result to arrest the gingival hemorrhage which sometimes occurs in the removal of tartar from the necks of teeth and to check the bleeding which comes from the abrasion of the gums caused by the slipping of an instrument, sandpaper

1. Revue de Stomatologie, Paris, quoted in Dental Cosmos.

2. Progrès Médical, April 5, 1902.

discs, emery wheels, etc., also in the removal of epulic tumors and after the extirpation of the pulp of a tooth. I have had good results with the use of adrenalin in conjunction with cocain in tooth extraction. I take a dram of the solution (1 to 1,000), add a grain of cocain (which gives about a 2 per cent. cocain solution) and inject a few minims into the gum. The cocain produces the usual local anesthesia, and the bleeding in almost every case has been extremely slight, and in some cases there has been no bleeding at all.

Bartholow says of turpentine: "It is a serviceable cardiac stimulant when the action of the heart is weak and the arterial tension low. In passive hemorrhages we possess few agents more generally useful. The indications for its use are a general debility, relaxation of the vessels and an impoverished condition of the blood. It need hardly be stated that active hemorrhage or a condition of plethora contraindicates the use of turpentine."

According to Garretson: "Depressing the action of the heart is under almost all circumstances a valuable means to arrest hemorrhage. To this end veratrum viride is always given with satisfaction. The dose is five drops for an adult, given in a tablespoonful of water. Conjoined with this, and in many instances quite capable of taking its place, is the hot foot-bath."

Dr. Arthur Masur, Breslau, Silesia, advises the use of powdered charcoal after tooth extraction where the hemorrhage requires special attention. In its review on current literature, the *Dental Cosmos* says: "His *modus operandi* is as follows: The alveolus, which is freely irrigated with pure water, is dusted with charcoal powder and to insure better adaptation of the charcoal to the bleeding capillaries it can be packed into the alveolus by means of cotton." There is also another and very easy way of carrying the powder into the alveolus—by means of a damp cotton tampon, which is made to take up the charcoal, and is then introduced into the canal. The powder is allowed to remain two minutes in the alveolus and is then washed out with a strong stream of water.

In cases in which it is desirable to leave a packing over night the use of iodoform gauze impregnated with charcoal is recommended, although the essayist states that he has never had to use this procedure, as he has always been able to arrest hemorrhage in these cases with the simple application of charcoal powder.

The action of the charcoal powder is supposed to be merely a physical one, the closing up of the openings in the capillaries with the charcoal granules. Incidentally, it is also stated, the charcoal has the property of hastening the healing of the wound, and its union with the tissues of the wound is very intimate, as it takes a strong stream of water to dislodge it.

Dr. Spaark, in a French medical journal, advises a wash of five parts of water to one of chloroform to prevent hemorrhage after tooth extraction.

It is not necessary to consider the long list of hemostatics, as alum, ergot, tannin, etc. I decidedly object to the use of styptic iron, or strong solutions of nitrate of silver as hemostatics in the mouth because of the danger of sloughing and secondary hemorrhage with an enlarged bleeding surface. Nitrate of silver destroys tissue and causes much inflammation to the mucous membrane, and styptic iron makes an objectionable stain which is difficult to eradicate.

For persistent hemorrhage I recommend, when simpler remedies fail, a sharpened stick of lunar caustic once applied as an actual cautery to the bleeding sockets of extracted teeth.

In treating hemorrhage after tooth extraction my method is this: I have the patient rinse his mouth with an antiseptic solution, I then syringe the bleeding sockets where the teeth were with pure peroxid of hydrogen, then follow with an antiseptic solution. This stops the hemorrhage, but should it recur I repeat the above procedure and then apply as an actual cautery a sharpened stick of lunar caustic run down very carefully into the very bottom of each socket, then pack tightly with antiseptic cotton held in place with a compress. The peroxid of hydrogen dissolves more thoroughly the clots from the mouths of the vessels, gives oxygen to the blood and stimulates the muscular contraction, and Nature is allowed to assist itself. This is somewhat in line with the old theory of exposing the bleeding surface to the atmosphere, the edges of the wound being drawn apart, the clots washed away, and bleeding for the moment encouraged.

Oral operations should be executed rapidly.

When it is necessary to use an anesthetic in operating in the oral cavity, chloroform should be chosen (unless contraindicated) as it is not a heart stimulant, it does not increase the blood pressure, and so adds nothing to the liability to hemorrhage. During the anesthesia of the patient care should be taken not to allow any blood to get into the lungs by way of the trachea or pneumonia will follow. Necessary precautions against asphyxiation will, of course, be taken. This can be prevented by the Trendelenburg position, the use of the saliva ejector and judicious sponging with hot water or ice water.

Of the many operations that are performed in the oral cavity for correcting congenital deformities, for hypertrophy of the gums, for affections of the tongue, the hard and soft palate, extirpation of cysts, tumors and malignant growths, clipping the uvula and operations on the tonsils, none is more common than the last named. The following comprehensive definition is given by Dr. Richard Faulkner: "The term 'tonsil' is now applied to various collections of lymphoid glands situated at the oropharyngeal orifice, the anal orifice and at points throughout the alimentary tract." We have to consider only the oral tonsils. "It is now agreed that they are absorbent glands of lymphoid structure, their chief function being the generation of lymph cells or leucocytes" which "escape through the surface epithelium of the tonsil into the free cavity of the pharynx where they destroy micro-organisms and other deleterious agents."

In operating on the tonsils there is usually considerable bleeding, as they are very vascular bodies, deriving their blood supply from the tonsillar and palatine branches of the facial artery, the descending palatine branch of the internal maxillary and the ascending pharyngeal. Usually the hemorrhage can be controlled. Fatalities from hemorrhage after amygdalotomy have been caused most often from hemophilia, or accidental injury to the adjoining larger vessels. Although the internal carotid is situated about three-fourths of an inch back, cases have been recorded where it has been punctured. Broca reports a fatal case due to an anomaly of this vessel.

Some New Orleans men will remember an operation performed here by Dr. Bemis several years ago for abscess of the tonsil. He opened the abscess with a bistoury and the man went home. After several hours there was a gush of blood. Dr. Bemis was visiting patients

and could not be found and the man bled to death. At the postmortem examination it was found that the abscess had disintegrated the walls of the carotid artery, and when the pressure exerted by the pus was relieved the walls of the vessel gave way.

The treatment for controlling hemorrhage after extirpation of the tonsils is ligating the larger vessels, where necessary; compression and styptics. Antipyrin is a favorite hemostatic in tonsillar surgery.

DISCUSSION.

DR. M. L. RHEIN, New York City—The use of adrenalin in dentistry should be known to all. It is an important part of our pharmacopeia.

DR. GEORGE F. EAMES, Boston—I have used the extract of the suprarenal glands and the various preparations made from it for some time, and my experience with it has been very satisfactory. It is the most wonderful drug in the control of hemorrhage I have ever used. In some cases it does not seem to act, but these cases are so rare that they may be classed as cases of idiosyncrasy or peculiar unsusceptibility to the drug. I think Dr. Belden is correct in saying that it probably does enhance the effect of cocain, but that alone it is not an anesthetic. The peculiar diathesis of a patient should be considered, and the greatest caution used in the preparation of the patient for an operation which is apt to cause hemorrhage.

DR. M. L. RHEIN, New York City—I believe that we, as stomatologists, demand a much more profound anesthesia than the laryngologist in his work. I do not believe it is possible to obtain profound anesthesia, that is, local anesthesia, with the chlorid of adrenalin. Used in the nose or the eye a certain amount of anesthesia is unquestionably obtained, but the fact that it is not complete anesthesia, I think, blinds us to the anesthetic properties that it does possess. I think this anesthetic property is produced mechanically by the contraction of the capillaries expelling the nerve cells from the fibrillæ.

THE INFLUENCE OF RESECTION OF THE CERVICAL SYMPATHETIC GANGLIA IN GLAUCOMA.

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CHICAGO.

(Concluded from p. 357.)

REPORT OF 61 ADDITIONAL OPERATIONS OF EXCISION OF SUPERIOR CERVICAL SYMPATHETIC GANGLION FOR GLAUCOMA.

Reports of these cases were sent to me through the kindness of the observers in response to the circular letter referred to. Lack of space prevents the publication of many of the details, but these have appeared in the Transactions of the Section on Ophthalmology of the American Medical Association.

JAMES MOORES BALL. THREE CASES OF GLAUCOMA. FOUR OPERATIONS.[1]

No. 8.—Absolute glaucoma of right. M., aged 36, with R. V.=P. l. L. V.=20/70. T.+3. After right sympathectomy tension fell to +1. Relief from pain for one year.

NOS. 9 AND 10.—Simple glaucoma of both in woman aged 43. R. V.=0. T.+3. L. V.=P.1. T.+. Left sympathectomy, June 15, 1899, was followed by improvement in tension and vision. L. V.=F. 5 ft. T.n. Rt. sympathectomy, July 16, 1899, with temporary improvement in vision and tension. R. V.= hand movements. T.+1.

1. THE JOURNAL A. M. A., June 2, 1900.

No. 11.—Sympathectomy in man 26 years old, gave immediate relief from pain in hemorrhagic glaucoma. No pain for 10 months.

MELVILLE BLACK. ONE CASE.[2]

No. 12.—M., aged 35, had subacute glaucoma in left eye. L. V.=F. 1 ft. T.+2. Sympathectomy done Dec. 24, 1900, followed by immediate return to normal vision, normal fields and tension. This favorable condition has continued up to time of author's report to me, April 7, 1903.

CALLAN. ONE CASE. BUPHTHALMUS; SECONDARY GLAUCOMA.

No. 13.—M., aged 25, with history of gradually failing sight. Highly myopic. Tension +1 in each eye. Right sympathectomy reduced the tension of right eye for a time, although it returned. The eye is not so large as before.

D. H. COOVER. ONE CASE.[3]

No. 14.—Simple glaucoma in both. M., aged 65. R. V.=P.1. T.+3. L. V.=20/200. T.+2. Right sympathectomy caused slight improvement in tension and vision, but this lasted only four months.

CUTLER. ONE CASE. CHRONIC IRRITATIVE GLAUCOMA. GREAT IMPROVEMENT.[4]

No. 15.—M., aged 56, with history of glaucomatous attacks for 8 years. Sclerotomy and also iridectomy had been done on the right. R. V.=F. 3 ft. T.+1. L. V.=0. T.+2. After eserin, R. V.=20/200. Right sympathectomy was followed by almost immediate improvement in vision and tension. R. V.= 20/30. T. n. Last report of author says this improvement seems to be permanent.

W. A. FISHER. ONE CASE. CHRONIC GLAUCOMA. NO IMPROVEMENT.

No. 16.—F., aged 62, with R. V. 12/200. T. n. Right sympathectomy had no effect on vision or fields, which gradually failed.

HENRY GRADLE. ONE CASE. CHRONIC GLAUCOMA. DISEASE. STATIONARY.

No. 17.—F., aged 33, had simple glaucoma in both eyes. R. V.=20/40. T.+. Contracted fields. L. V.=0. Two iridectomies had been done on right eye, but had only delayed the disease. Right sympathectomy reduced the tension, which is normal after two and a half years. Central and peripheral vision unchanged.

E. GRUENING. TWO CASES. ONE CHRONIC GLAUCOMA (BOTH). ONE OPTIC ATROPHY (BOTH).[5]

No. 18.—M., aged 50. Chronic glaucoma three years. R. V.= F. 2 ft. T.+1. L. V.=0. T.+1. Previous iridectomy. Right sympathectomy reduced tension to normal, and this remained so up to time of report. No change in vision.

No. 19.—M., aged 35. Double optic atrophy. R. V.=0. L. V.=20/30. Marked contraction of fields. T. n. Left sympathectomy had no effect on the vision. In both these cases there was paralysis of recurrent laryngeal, lasting many months.

A. B. HALE. ONE CASE. SYMPATHECTOMY FOR THREATENED GLAUCOMA.

No. 20.—F., aged 48. R. V.=0. T.+, although two iridectomies had been done. L. V.=6/5. T.+. Fields contracted. Left sympathectomy was done to ward off an impending attack of glaucoma. Fields returned to normal.

J. G. HUIZINGA. TWO CASES. 1. DOUBLE CHRONIC SIMPLE GLAUCOMA. DOUBLE SYMPATHECTOMY. IMPROVEMENT IN TENSION. 2. CHRONIC INFLAMMATORY GLAUCOMA. SYMPATHECTOMY. NO IMPROVEMENT.

NOS. 21 AND 22.—M., aged 57. R. V.=P.1. T.+1. L. V.= 6/20. T. n. Contracted fields. Double sympathectomy caused no material change in vision, but reduced tension to normal, where it remained.

No. 23.—M., aged 36. Double inflammatory glaucoma of several years' duration. R. V.=F. 3 ft. T.+3. L. V.=F. 3 ft.

2. Ophthalmic Record, October, 1901.
3. Phila. Med. Jour., March 16, 1900.
4. Annals of Surgery, September, 1902.
5. Ophth. Sec. N. Y. Academy of Med., November, 1901.

T.+3. Left sympathectomy had no effect on vision and patient became blind. Tension remained high.

ARNOLD KNAPP. ONE CASE. DOUBLE CHRONIC GLAUCOMA WITH ATROPHY. DOUBLE SYMPATHECTOMY. SLIGHT IMPROVEMENT.

Nos. 24 AND 25.—M., aged 20. R. V.=16/200, after iridectomy. L. V.=12/200 (?). T.+2. Fields contracted.

After double sympathectomy vision in each improved to 20/200, and at time of last report, ten months later, R. V.=20/200. T. n. L. V.=12/200. T.+.

HARRY LA MOTTE. FIVE OPERATIONS. 1. DOUBLE ACUTE GLAUCOMA. RIGHT IRIDECTOMY, RECOVERY. LEFT SYMPATHECTOMY. RECOVERY.[6]

No. 26.—M., aged 27. Acute glaucoma in each eye relieved by eserin. R. V.=F. 16 ft. Iridectomy followed by improvement of vision to 20/50. L. V.=P.1. T.+1. Left sympathectomy was followed by great improvement. Eighteen months after operation, L. V.=20/20. T. n. Pupil normal.

Nos. 27 AND 28.—F., aged 38. Chronic inflammatory glaucoma of two years' duration. R. V.=20/30. L. V.=20/200. Slight cupping. No fields taken. Left sympathectomy was followed by marked improvement. L. V.=20/20. T. n. Right sympathectomy was done because vision of right eye suddenly failed. After operation vision returned to normal. Eighteen months later R. V.=20/20. T. n. L. V.=20/20. T. n. Some contraction of fields.

No. 29.—M., aged 43. Simple glaucoma of right eye. R. V.=F. 3 ft. T.+2. Right sympathectomy followed by improvement of vision to 20/70. This vision was retained fourteen months after, but tension was increased.

No. 30.—M., aged 40. Simple glaucoma for one year. R. V.=20/30. T.+1. Fields contracted. L. V.=20/20. T. n. Right sympathectomy. During the operation the patient vomited and infected the wound. In spite of careful cleansing, the infection spread and he died of septic pneumonia.

JOSEPH MULLEN. DOUBLE CHRONIC INFLAMMATORY GLAUCOMA. PREVIOUS IRIDECTOMY. RIGHT SYMPATHECTOMY WITH IMPROVEMENT.[7]

No. 31.—F., aged 48. History of bilateral iridectomy 23 years previously for acute glaucoma. R. V.=F. 5 ft. T.+2. L. V.=5/200. T.+2. Contracted fields. Right sympathectomy relieved pain, increased visual fields and reduced the tension to normal. At the time of the last report, nearly three years after the operation, R. V.=20/100. L. V.=20/70. Fields about the same as before operation.

W. B. MARPLE. CHRONIC GLAUCOMA. SYMPATHECTOMY. NO IMPROVEMENT.[8]

No. 32.—V. 10/200. T.+1. Pupil dilated. After sympathectomy tension became normal and pupil diminished in size. Vision unchanged. Observation six months.

H. B. PRICE. TWO CASES. DOUBLE SIMPLE GLAUCOMA WITH HEMORRHAGIC RETINITIS AND CHRONIC NEPHRITIS. RIGHT SYMPATHECTOMY. IMPROVEMENT.

No. 33.—M., aged 70. R. V.=P.1.; under eserin, 20/200. T.+. Hemorrhages in macular region. L. V.=20/200. T. n. Glaucoma cup, retinal hemorrhages. Right sympathectomy caused reduction of tension, and V.=20/100. Five months later R. V.=20/100. T. n. Fields enlarged.

No. 34.—M., aged 55. V. B.=20/40 to 20/70. T.+. Contracted fields. Iridectomy had been done five months previously. Right sympathectomy reduced tension. Patient under observation only 15 days.

R. C. REESE. ONE CASE OF DOUBLE SIMPLE GLAUCOMA. IRIDECTOMY FIVE YEARS BEFORE. RIGHT SYMPATHECTOMY. IMPROVEMENT.

No. 35.—F., aged 58. R. V.=F. 10 ft. T.+. Fields contracted. L. V.=0. Iridectomy on both eyes five years before. Right sympathectomy reduced the tension, but did not improve central vision. One year later T.—. Fields and vision unchanged.

6. Denver Medical Times, March, 1903.
7. Amer. Med., June, 1901.
8. N. Y. Med. Record, May 10, 1902.

E. C. RENAUD. SIX CASES (FIVE BILATERAL).[9]

No. 36.—F., aged 48. Right chronic inflammatory glaucoma. R. V.=20/200. T.+3. L. V.=20/20. T. n. Right sympathectomy followed by improvement. R. V.=20/50. T. n. Disappearance of pain. Improved condition remains, three years later.

Nos. 37 AND 38.—M., aged 52. Double simple glaucoma. R. V.=quantitative. T.+2. L. V.=large objects 6 ft. T.+2. Bilateral sympathectomy reduced tension to +1 and vision to 6/100. Improvement retained, two years after operation.

Nos. 39 AND 40.—F., aged 40. Chronic simple glaucoma of left. R. V.=20/20. T. n. L. V.=F. 3 ft. T.+3. Bilateral sympathectomy brought tension to normal. L. V.=F. 14 ft. Improvement continues two years after operation.

Nos. 41 AND 42.—M., aged 39. Chronic irritative glaucoma of right. R. V.=P.1. T.+2. L. V.=20/20. T. n. Bilateral sympathectomy relieved pain, improved right vision to F. 12 ft. T. n. Same improved condition one year later.

Nos. 43 AND 44.—M., aged 57. Acute glaucoma in right. R. V.=20/100. T.+3. L. V.=20/20. Bilateral sympathectomy. Pain and increased tension disappeared and pupil contracted. R. V.=20/40. Ten months later no return of trouble.

Nos. 45 AND 46.—M., aged 46. Right chronic irritative glaucoma. R. V.=20/200. T.+2. L. V.=20/20. T. n. Bilateral sympathectomy caused reduction of tension. R. V.=20/100. Favorable result continues six months later.

G. E. DE SCHWEINITZ. ONE CASE. DOUBLE CHRONIC CONGESTIVE GLAUCOMA. BILATERAL SYMPATHECTOMY. RESULT UNCERTAIN.

Nos. 47 AND 48.—M., aged 23. R. V.=shadows on temporal side. T.+2. L. V.=shadows. T.+2. Right sympathectomy caused contraction of pupil, which lasted only three days. Slight improvement of vision and tension. Left sympathectomy caused no change in tension, pupil or field. Patient was free from glaucomatous attacks for two months, then they returned.

JOHN R. SHANNON. ONE CASE. DOUBLE SIMPLE GLAUCOMA. LEFT SYMPATHECTOMY. NO IMPROVEMENT.

No. 49.—F., aged 32. R. V.=15/200. T.—. L. V.=F. 3 ft, eccentrically. T.+1. Iridectomy had been done. Left sympathectomy caused no change in vision or tension.

J. H. SHORTER. SECONDARY GLAUCOMA AFTER SYMPATHETIC INFLAMMATION. LEFT SYMPATHECTOMY. SLIGHT IMPROVEMENT.[10]

No. 50.—M., aged 20. Lost right eye from trauma. Glaucoma in left eye following sympathetic ophthalmia. L. V.=F. 3 ft. T.+2. Left sympathectomy. L. V.=F. 6 ft. T. n. Fields slightly increased. Improvement continues.

ELMER G. STARR. DOUBLE SIMPLE GLAUCOMA. POSTERIOR SCLEROTOMY. BILATERAL SYMPATHECTOMY. MARKED IMPROVEMENT.

Nos. 51 AND 52.—F., aged 63. Disease controlled for nine months with eserin; then sudden reduction of vision. R. V.=F. 4 ft. T.+3. L. V.=F. 4 ft. T.+3. Sclerotomy of right eye improved vision to F. 18 ft. After bilateral sympathectomy R. V.=20/50. T.+1. L. V.=20/50. T. n. Pupils normal. Improvement persisted up to time of report, six months later.

GEORGE F. SUKER. FOUR CASES, FIVE OPERATIONS.[11]

No. 53.—M., aged 70. Double chronic glaucoma. R. V.=0. Absolute glaucoma. L. V.=20/200. T. n. Iridectomy of left in 1898. Right sympathectomy produced no change in fields, tension or vision.

Nos. 54 AND 55.—M., aged 65. Double simple glaucoma. R. V.=F. 8 ft. T.+2. L. V.=F. 10 ft. T.+. Fields contracted. After bilateral sympathectomy fields enlarged slightly and then contracted to less than before. No improvement.

No. 56.—F., aged 67. Chronic inflammatory glaucoma of left. R. V.=20/40. T. n. L. V.=20/100. T.+2. Nasal contraction of field. Left sympathectomy caused enlargement of fields and normal tension. L. V.=20/100. Improvement continued until patient's death, three years later.

9. St. Louis Med. Review, Feb. 1, 1902.
10. Medical News, April 6, 1901.
11. THE JOURNAL A. M. A., 1901.

No. 57.—M., aged 58. Absolute glaucoma of right. Chronic inflammatory glaucoma of left. R. V.=0. T.+3. L. V.=20/80. T. n. Fields normal. Iridectomy of left had been done some time before. Right sympathectomy produced no effect on tension or vision.

DAVID WEBSTER. ONE CASE. RIGHT SIMPLE GLAUCOMA. LEFT ABSOLUTE GLAUCOMA. EIGHT SYMPATHECTOMY. IMPROVEMENT.

No. 58.—M., aged 49. R. V.=20/50. T.+. Field slightly contracted. L. V.=0. T.+3. Right sympathectomy. Fields improved. R. V.=20/30. T.—. One year later R. V.=20/50. T. n. Fields as before operation.

JOHN E. WEEKS. FIVE CASES. SEVEN OPERATIONS.[12]

No. 59.—F., aged 56. Chronic glaucoma of right. R. V.=F. 1 ft. T.+2. Fields contracted. L. V.=20/20. T.+1. After right sympathectomy fields increased markedly, but tension remained plus. Five weeks later R. V.=20/70. T.+1. Some weeks after an acute attack of glaucoma in the right eye necessitated iridectomy after which R. V.=F. 7 ft.

Nos. 60 AND 61.—M., aged 70. Simple glaucoma of right (absolute), subacute glaucoma, left. R. V.=P.l. T.+2. L. V.=20/40. T.+2. Fields contracted. Bilateral sympathectomy relieved the tension in the right eye, and markedly improved the left. L. V.=20/20. Fields much improved.

No. 62.—Simple chronic glaucoma of left. Absolute glaucoma of right. R. V.=0. T.+3. L. V.=20/70. T.+. Fields contracted. After left sympathectomy L. V.=20/30. T. n. Three months later. L. V.=20/20. T.+. Fields increased.

Nos. 63 AND 64.—M., aged 30. Simple glaucoma of both. R. V.=20/40. T.+1. Right sympathectomy reduced tension to normal, but excited acute attack in left eye. L. V.=1/200. Left sympathectomy not successful, for tension of left eye remained high and iridectomy was done. Later iridectomy was done on right eye for increased tension. Last report R. V.=20/40. T. n. L. V.=F. 17 ft.

No. 65.—M., aged 40. Simple glaucoma of both. R. V.=0. T.+3. L. V.=F. 5 ft. T.+. Iridectomy had been done. Left sympathectomy followed by improvement in tension and vision. Three months later L. V.=20/200. T. n.

MEYER WIENER. TWO CASES.

No. 66.—F., aged 50. Chronic inflammatory glaucoma right. R. V.=F. 12 ft. T.+2. L. V.=0. Right sympathectomy caused no change in vision or tension.

No. 67.—F., aged 45. Chronic simple glaucoma of right. R. V.=6/200. T.+1. L. V.=6/6. T. n. Right sympathectomy. No improvement.

H. W. WOODRUFF. ONE CASE. SIMPLE GLAUCOMA OF LEFT.[13]

No. 68.—M., aged 29. R. V.=0. Result of an injury. L. V.=20/40. T.+. Fields contracted. After left sympathectomy T. n. and improved vision. Later central vision improved to 20/20. Six months later return of all symptoms and iridectomy was done with a final result of L. V.=20/70. T. n. Contracted fields.

We have here records of 68 operations done on 54 cases, i. e., 14 were bilateral. Of these operations, 38 were for simple glaucoma; 16 for chronic inflammatory glaucoma; 4 for subacute glaucoma; 3 for acute glaucoma; 4 for absolute glaucoma; 2 for hemorrhagic glaucoma; 1 for buphthalmus.

Of these five operations were preventive, one by Hale (20), four by Renaud (40, 42, 44, 46). No glaucoma up to time of reports. One death occurred (30). Of the 38 operations for simple glaucoma, 14 gave no improvement whatsoever. Five were temporarily improved for periods ranging from fifteen days to eight months, but had recurrent attacks that necessitated iridectomy or caused loss of the eye. Fifteen were improved as long as they were under observation, for periods of from two months to two years. Of these three were stationary (5, 17, 58); one died (30); six remained unimproved after iridectomy, but improved after sympathectomy (17, 18, 24, 34, 35, 65).

Concerning the 15 that were improved, No. 9 showed slight improvement; No. 18 improvement as to tension; previous iridectomy had been done; observation, one year; No. 24, improvement as to central vision and tension; No. 29, marked improvement; observation, fourteen months; No. 34, previous iridectomy had been done; improvement after sympathectomy, but patient was only under observation for fifteen days; No. 35, previous iridectomy, after the sympathectomy the tension remained minus; Nos. 37 and 38, slight improvement as to vision, but tension is still plus; time of observation, two years; No. 40, improvement as to tension, slight improvement as to vision; time of observation, twenty months; Nos. 51 and 52, marked improvement in tension and vision; posterior sclerotomy had been done without effect; time of observation, six months; Nos. 62 and 65, previous iridectomy; marked improvement in tension and vision; time of observation, four months; Nos. 4 and 6 showed marked improvement, and have been under observation for nine months and four months, respectively.

Of the 16 operations for chronic inflammatory, 6 showed no improvement; 3 showed improvement for periods from two to three months (2, 31, 50); 4 were improved as long as they were under observation; 1 (45) five months, 1 (15) eighteen months, 1 (41) one year, 1 (36) three years.

Of these 1 (15) had not been benefited by iridectomy, but greatly improved by sympathectomy; eighteen months under observation; 3 (20, 42, 46) were preventive, and disease had not appeared at three months, eight months and one year after operation.

Of the four that showed improvement, No. 15 is the most interesting, because an iridectomy failed to check the disease, but sympathectomy produced marked results in central and peripheral vision. Time of observation, eighteen months.

In No. 36, improvement in central vision continued after three years, tension slightly plus; in No. 41, improvement continues after one year; in No. 45, vision and tension were improved and pain was relieved; time of observation, five months.

No. 20 is interesting in that the operation was done for threatened glaucoma.

In Nos. 42 and 46 it is not stated whether the bilateral operation was done to influence more profoundly the diseased eye or to prevent the occurrence of the disease in the perfectly sound eye. The same may be said concerning Cases 39 and 44, in which one eye was normal in every respect.

Of the 4 operations for subacute glaucoma, 1 (12) cured at the end of two and a half years (Black); 2 (27, 28) remained well at end of fifteen months (LaMotte); 1 (60) remained improved after observation of four months (Weeks).

Of the three operations for acute glaucoma, 1 (26) recovered; observation, fifteen months (LaMotte); 1 (43) improved; remained so after nine months (Renaud); 1 (44) preventive; no attack occurred.

Of the four operations for absolute glaucoma, 1 (8) improved as to pain; 3, no improvement and no change.

Of the two operations for hemorrhagic glaucoma, 1 (11) improved as to pain; 1 (33), improved vision during time of observation, five months.

One operation for buphthalmus had no effect.

12. Trans. Amer. Ophth. Soc., 1902.
13. Chicago Med. Recorder, July, 1901.

SUMMARY.

Form of Glaucoma.	No. of Cases.	Improved.	Temporarily Improved.	Stationary.	Unimproved.
Simple chronic	38	15	5	3	15
Chronic inflammatory	16	4	3	3	6
Subacute	4	3	1	..	..
Acute	3	1	1	1	..
Absolute	4	1	..	..	3
Hemorrhagic	2	2	..	..	..
Buphthalmus	1	..	..	..	1
	68	26	10	7	25

After these 68 operations miosis is mentioned as occurring 40 times, and this condition remained for periods ranging from two days to three years. In most cases it seems to be permanent. It is mentioned that in 34 cases the tension was reduced to normal, and in 9 others it was much lower than it was before the operation. As to the effect of the operation on the lid, conjunctiva, face, etc., ptosis occurred in 36 cases and lasted for periods ranging from thirteen days to one year. This, like miosis, is one of the most constant phenomena. Conjunctival congestion was noted in 19 cases, lasting for a variable time, usually not longer than a few days. One case persisted for three months. Increased lachrymation was observed in 18 of the cases. This was of short duration, but in one case lasted three weeks. Congestion of the face on the side operated on was observed six times, in one case lasting three months.

Neuralgia and hyperesthesia of the side of the face operated on was noted in six cases, lasting in one case for one year. Anesthesia of the face or neck on the operated side was mentioned in only two cases; in one of them it lasted three months. Hoarseness or aphonia occurred in 8 cases, lasting for a variable time, from one week to three weeks. In two of the cases dysphonia was the result of paralysis of the recurrent laryngeal, and lasted in one for nine months and in the other for two years. Dysphagia was observed in 5 cases as a result of the operation. This symptom lasted only two or three days, except in one case, in which it persisted for six months. In one case (5), for a period of several days after the operation, the patient had mild hallucinations.

The results exhibited in this series of cases, at first glance, do not seem as favorable as those presented by Rohmer,[14] who drew conclusions from a study of 74 cases collected by Bichat, to which he added 20 of his own. On these 94 cases, 114 operations were done. The following table gives a summary of the results of their analysis of these cases:

Form of Glaucoma.	No. of Cases Operated on.	Improved.	Negative.	Worse.
Simple chronic	43	36	5	2
Chronic inflammatory	34	23	10	1
Subacute	14	6	6	2
Acute	9	4	5	..
Absolute	3	1	2	..
Hemorrhagic	5	5	..	..
Hydrophthalmus	6	4	1	1
	114	79	29	6

The statistics of Ziehe and Axenfeld,[15] who studied the results in 55 cases, agree with this in the main, for many of the cases in each series are the same. Unfortunately, many of these cases, as in the present series, either do not give the final result, or were under observation such a short time as to make any statement as to the final outcome impossible. Again, in studying them, it is seen that the records of many of them are far from exact.

However, to quote Axenfeld: "There is obtained by this operation in a certain proportion of cases of simple glaucoma, a definite and important result, and, in some instances, there has been a decided improvement, even where a previous iridectomy had failed." Such cases as those reported by Grunert,[16] Demicheri,[17] Cutler, Starr[18] and Weeks,[19] in which sclerotomy and iridectomy had been unsuccessfully performed, and sympathectomy accomplished not only reduction in tension but improvement in both central and peripheral vision, speak strongly in favor of the operation in certain cases.

As was said in the beginning, I feel that positive conclusions are not yet to be reached, and will not be until more carefully selected cases can be studied for longer periods of time.

The operation in itself, while a major one, is not to be considered one of unusual danger, and with modern technic should show a very trifling mortality. The death recorded in our present series was purely accidental, and might have occurred in any other operation on the neck. With such brilliant results before us as are presented in certain cases on record, we must agree that sympathectomy is not an operation to be condemned too hastily. It certainly is not fair to condemn it when it fails to restore sight to an eye that has suffered so long from glaucoma that it is blind from atrophy of the nerve, or when it fails to check pain in an eye that is hopelessly lost from absolute glaucoma.

If it is to be compared with iridectomy at all, it should be given an early trial in any form of the disease in which it is applicable.

The statistics up to date seem to indicate that the simple chronic form is the one most suited for it, next to the hemorrhagic form, if that can be determined. As a guide for my own practice, I should feel very much like following Abadie[20] when he says: "In acute forms of glaucoma and in subacute with intermissions, practice first iridectomy, and if it fails do sympathectomy. In simple glaucoma use miotics twice a day; if they suffice, continue them. If, in spite of their systematic employment the vision fails, do sympathectomy."

DISCUSSION

ON THE PAPERS OF DRS. DE SCHWEINITZ, WILDER, BALL AND WEEKS.*

DR. MELVILLE BLACK, Denver—It has been a great privilege to listen to these papers, and I am sure we must all feel that we know more about the subject now than we did before. It is a particularly interesting subject to me, and I believe that we can feel from the statistics presented so far that the operation is one of value. It is an operation, however, that is to be properly considered. My own personal feelings are that it should not be performed as a last resort, but really as a first one. The statistics of the operation will be vitiated, and have been up to the present time, by attempting it as a procedure where nothing could possibly be of any benefit. If sympathectomy is to be of any service it must be before the filtration angle is blocked or closed. If this angle has been occluded it is a question if the operation can be of any permanent benefit. It would seem to me that where eserin has a prompt action in relieving tension and pain and in improving vision and bringing up the field, that the action of sympathectomy should be correspondingly good and more permanent; that is, we can liken somewhat the after-effects of sympathectomy to the effects we obtain from the use of eserin. Of course, we can not continue the use of eserin indefinitely, and if we have in this procedure something permanent, it is certainly of great value.

14. Annales d'Oculistique, May, 1902.
15. Ziehe and Axenfeld: Sympathicus Resection beim Glaukom. Rostock, 1901.
16. Archiv. f. Augenheilk., 1900, vol. xlii.
17. Annales d'Oculistique, vol. cxxi, 1899.
18. Loc. cit.
19. Loc. cit.
20. Archives d'Ophthalmologie, May, 1901.

* The papers of Drs. de Schweinitz, Ball and Weeks appeared in THE JOURNAL January 30, and the paper of Dr. Wilder was begun in THE JOURNAL February 6.

I am inclined to believe that the results will not be as permanent as we would wish. With watching this one case of mine it has seemed to me that the eye is getting from some source more and more sympathetic nerve power. The ptosis is subsiding; the eye is no longer congested; the pupil is becoming more nearly the size of its fellow; at one time we had .50 diopter of myopia—we now have .50 diopter of hypermetropia. Therefore it would seem to me that this eye is gradually regaining its sympathetic nerve supply.

It would seem to me that where this operation is done a sufficiently extensive procedure should be adopted to insure as much cutting off as possible of the sympathetic nerve supply; and that therefore it would seem well to excise the middle ganglion with the superior. Any one who has watched the operation will have noticed how associated these two ganglia are and how easy it would be in removing the superior alone to have a supply from the middle. Dr. Freeman, Denver, has operated on ten cases, removing both ganglia. Only one of these operations, however, was done for glaucoma. He has seen in his practice no undesirable results following this procedure, and his opinion was, as I obtained it, that the operation was a comparatively easy one unless the subject were an enormous, bull-necked individual. The scar resulting is slight, provided a buried suture is placed, and in the course of three or four months it is scarcely possible to find a scar. The only thing of serious consequence that may follow is neuralgia, and that seems to be due to rather unnecessary bruising of some of the nerves that come off through the vertebræ.

I think that this operation is one that we should all consider, so far as our statistical results present, as being one of value, and while we should not embrace it with too much enthusiasm, yet at the same time we should give it the benefit of the doubt as being of some service, and we should not depend on the operation only where iridectomy has failed and all other known procedures have failed. It should be tried first, not last. Several cases have been reported where the operation has been of value even after iridectomy has failed. This might lead us to think that in certain cases ganglion excitation existed and that the removal of the ganglia relieved that irritation, which might have been the beginning cause of the glaucoma.

DR. G. C. SAVAGE, Nashville, Tenn.—I believe we have some reasons for holding the opinion that the sympathetic nervous system is the source of power that Nature has given us for the correction of astigmatism. That in early life every astigmatic eye has the power of correcting a considerable portion of its defect, if not all, is now universally believed. One must certainly be convinced that Nature has furnished some power by which this defect is remedied. It is not in Mueller's muscle, nor in the third nerve. In my own case atropin and homatropin were used to uncover my error of refraction, but both failed. I am to-day wearing a lens four times as strong as that with which I commenced. Each time the increase was made I got additional relief, until finally the full strength lens was given. I happened to be in Dr. Burnett's office in 1889 and my corneal astigmatism was the same then as it is to-day. A considerable portion of my astigmatism was corrected by some means within the eye in spite of a mydriatic.

Only two meridians of any cornea that is astigmatic have a focus—the two principal meridians. One is the meridian of greatest curvature, and the other of least curvature. When Mueller's muscle, supplied by the third nerve, contracts, the lens is made more convex, and the two foci are brought into definite relation with the retina, but not closer to each other. hence they are not made to fuse. The other muscle in the ciliary body is that of Bowman, which I believe is controlled by the superior cervical sympathetic. If under the influence of the sympathetic some fibers of Bowman's muscle can be thrown into contraction while others are not, it would result in tilting of the lens. When the lens is tilted on an axis in the plane of the meridian of greatest curvature the two foci are made to approach each other, and if the tilting be far enough they are fused into one. The power given us by Nature for the correction of astigmatism is in Bowman's muscle, and I believe it acts under the influence of the superior cervical sympathetic ganglion.

DR. GEORGE F. SUKER, Chicago—I maintain that the relation between any form of glaucoma and the sympathetic nervous system, including the cervical, is still open for considerable debate. We do not to a certainty know the physiologic tracts of the cranial sympathetic fibers in all instances; nor do we know whether or not these sympathetic fibers decussate in all individuals as do the cranial nerves proper. The ganglion of Ribes, situated on the anterior communicating artery, is not present in every instance according to some anatomists. Yet, if it is present, it is here where the cephalic extremities of the ascending branches of the cervical sympathetic fibers join and cross. This point may explain why, in some cases, a unilateral excision of the ganglion is of only temporary benefit. For, if this communication does exist, it is not unreasonable to suppose that the opposite side is furnishing the abnormal stimulus through the intact cephalic ends of the excised side. Just as the other corresponding nerve centers take up the function of its fellow when it is destroyed, so may the sympathetic system, by means of its ganglia, do the same. This fact may and does explain why in Dr. Black's case there was a return of the function of the sympathetic with its detrimental effects on the side operated on.

There is no justification in excising the middle cervical ganglion as well as the superior for glaucoma. However, it is very necessary to cut the connecting cord and excise that ascending branch of the middle ganglion which connects with the ascending fibers of the superior ganglion high up in the neck. It is only the cavernous and carotid plexuses of the superior ganglion which have any relation to the eye. For reasons already stated it is necessary to completely destroy the connections between these two ganglia.

The ciliary or lenticular ganglion must also be considered if we expect to explain the relation of the sympathetic fibers to glaucoma. For, it is the upper two-thirds which contain sympathetic filaments supplying the anterior segment of the eye. The lower third of this ganglion receives a branch of the third nerve. Furthermore, the sympathetic fibers in the rami communicantes, which are closely associated with the fifth nerve and enter the eye along with the optic nerve, must be seriously considered. These branches also supply the segment of the eye around which centers the pathology of glaucoma. The experiments of Anderson,[1] Delens[2] and Rohmer[3] with the sympathetic supply of the eye are to be considered in solving its relation to glaucoma. Especially are these various sympathetic fibers and ganglia to be surgically thought of in glaucoma, for we know that the superior cervical is frequently, if not invariably, histologically changed. What is true for this ganglion may hold true for the others also.

In no case of glaucoma have all the sympathetic fibers and ganglia, on one or both sides, supplying that eye ever been severed. Experimentally they have, then tension was reduced and the iris remained contracted, both permanently.

It is questionable, as Dr. de Schweinitz has stated, whether any trophic actions can be ascribed to the sympathetic nerves. As yet we are not in a position to attribute any trophic functions to certain kind of nerves. The untoward effects which follow the extirpation of the superior sympathetic ganglion are trivial and not permanent. The only one to receive any consideration is the enophthalmus; this, however, is only slight and does not supervene in every case.

The statistics here given by Drs. Wilder and Ball show that the operation was undertaken in such cases as might well be called desperate. Therefore, the operation has not been awarded a fair trial. There is no doubt that in well-selected cases it will accomplish what an iridectomy will not. In my hands the operation has been successful in a few instances, as the reports of the cases show. What good the excision of the ganglion will do in optic atrophy is yet debatable. In the case on which I operated I did obtain a decided benefit, though temporary. Dana of New York tried it

1. Jour. Phys., vol. xxviii, No. 3.
2. Bull. de la Soc. de Chirurgie, April, 1902.
3. Annals d'Oculistique, July, 1902.

in a case of tabetic atrophy, though with what success I could not ascertain.

Several years ago I was quite enthusiastic concerning the future of sympathectomy; but of late I have become very conservative, as my paper before this Section in 1901 clearly demonstrated.

DR. EDWARD JACKSON, Denver—The trend of the papers would seem to indicate that we are not in a position to decide many questions in reference to the use of excision of the sympathetic ganglia in glaucoma. Yet in going over the literature one point seemed pretty clear to me, and that is confirmed this morning. Dr. Black broached it when he said that the case in which excision does good is the case favorably influenced by eserin. I think there is enough evidence now, although it lies in a very small minority of the published cases, to indicate that sympathectomy, or excision of the ganglia, will do good in the cases that would be benefited by iridectomy. If we consider apart those cases in which iridectomy would have been a hopeful operation, I think the record for sympathetic excision is very promising. That might appear to be saying that operations on the sympathetic had no place where iridectomy is an established operation, but such is not the case. I think sympathectomy may be of value in an important class of cases; as where one eye has been lost and it is difficult to get the patient to consent to an operation on the other eye at the stage where the operation is most hopeful, where iridectomy can not be done, or the patient can not be induced to have it done, and yet where if it were done the probabilities would be in favor of it, we are now justified in urging operation on the sympathetic. The cases where iridectomy is reported to have been done and no good accomplished, and then sympathectomy has been efficient, might seem to lead in another direction. I have seen one case where iridectomy did no good and sympathectomy afterwards restored vision. But it may be that in some of these cases where iridectomy is said to have been done it has not been a broad, complete excision of the iris, which I believe necessary to give iridectomy its best effect.

DR. G. E. DE SCHWEINITZ, Philadelphia—The members of the Section must have realized that it has been impossible in presenting a résumé of the physiologic side of this question to read in detail the experiments and observations on which the conclusions were based. For example, I did not have time to discuss the question of the pupil-dilating fibers which do not run in the sympathetic system, although in the extended paper I have made reference to them. I confess that I am distinctly skeptical as to the permanent value of sympathectomy in the treatment of glaucoma, although I realize that a certain number of brilliant results have followed this operation, and also realize that at present our statistical information is to a certain extent misleading, because the operation has in most instances been utilized as a last resource, and therefore the results of prompt interference according to this method are not at our disposal, or, at least, at our disposal in a most limited degree. Dr. Black's idea that if the effect of eserin on a glaucomatous eye is good, we may reason that sympathectomy would likewise be followed by good results, does not seem to me to be an entirely safe guiding principle. Eserin accomplishes its good in those cases in which it is able to release the filtration angle from blockade by contracting the pupil and drawing the periphery of the iris away from the danger of adhesive inflammation to the structures in the filtration angle. Now, in a certain number of cases, perhaps in the majority of cases in which sympathectomy has been performed, the process has been a chronic one in which pronounced blockade in the filtration angle was lacking, cases in which it is possible that there may have been a hypersecretion of the intra-ocular fluids, or an increased serosity. Cases of acute glaucoma are just the ones in which strong solutions of the myotics give frequently the best temporary relief, and they are certainly not the ones in which the sympathectomy is advisable, at least, as far as our present knowledge goes. I entirely agree with Dr. Suker, and all physiologic investigation is on his side, that it is not necessary to excise the middle ganglion. Excision of the superior ganglion, which is the relay station for the sympathetic nerve supply for the whole of the head, accomplishes everything that can be accomplished by this operation in so far as the relief of glaucoma is concerned. Referring to Dr. Savage's interesting observations on his own eyes, I may say that in the extended paper I have reviewed at some length the action of the sympathetic on the eye in its relation to accommodation and refraction. The evidence is exceedingly contradictory, and the whole subject is an inviting one for further research.

DR. WM. H. WILDER, Chicago—The report of the histologic appearance of the ganglia that were excised was not read, but if any of you are interested in seeing the specimens they are on exhibition in the next room. The ganglia do not show, as was stated by Dr. Weeks, any increase in connective tissue, but one can see in the specimens that there is an increase in the adventitia of the coats of the vessels and that there is considerable pigment in the cells.

One important question comes up in connection with the statement made by Dr. Black, that he considers that where there is good contraction of the pupil with eserin sympathectomy would be indicated; one case I have reported, Case 7, makes me doubt seriously whether we should resort to sympathectomy or to iridectomy first in these cases of simple glaucoma. I am skeptical about the value of iridectomy in true simple glaucoma, particularly where the anterior chamber is of normal depth, and it is in such cases that sympathectomy should do good. We can not place much reliance on either procedure, but perhaps we can rely as much on sympathectomy as on iridectomy. The unpleasant experience in Case 7 suggests that possibly it might be safer to do the iridectomy first. In spite of the sympathectomy in this case, the tension and the central vision remained the same; the peripheral vision continued to contract until it was as though the patient were looking through a narrow gun barrel. I did an iridectomy and there was hemorrhage from the choroid and the eye was lost. A similar case has been reported by Mohr. However, in such a case the same accident might happen if sympathectomy had not been done.

It is not fair to condemn the operation when it fails to restore an eye that has atrophy of the optic nerve, or when it fails to relieve pain in an eye lost from glaucoma. It should be given an early trial. The statistics indicate that the simple chronic form is the most suited for the operation, with the hemorrhagic form next.

DR. J. M. BALL, St. Louis—As to the pathologic changes found in the ganglia, we have found in exophthalmic goiter that the same pathologic condition exists. It is the same in each of these conditions—an overgrowth of connective tissue, a separation of the nerve elements and the presence of pigment. I have been told by Dr. Fish of St. Louis that the same changes are found in multiple sclerosis and in tabes.

NEW ASPECTS OF YELLOW FEVER ETIOLOGY

ARISING FROM THE EXPERIMENTAL FINDINGS OF THE LAST THREE YEARS.*

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In the light of modern researches yellow fever must now be considered as a disease produced, in individuals belonging to certain human races, by a two-host, microscopic, perhaps ultra-microscopic germ, endoparasite of the female of a particular species of mosquito—the *Stegomyia fasciata* (Theobald).

This germ pursues its parasitic existence in the body of the infected stegomyia during a period of 59 days, as experiments have proved, and probably, under ordinary circumstances, till the death of its mosquito-host. In order, however, that it may complete its life cycle, secure the perpetuation of its species and find its way

* Read at the thirty-first annual meeting of the American Public Health Association, Oct. 28, 1903. Washington, D. C.

into the body of other healthy stegomyias, it is necessary that it should penetrate, through the bite of the infected insect, into the body of a person who is liable to undergo an attack of yellow fever.

After parting from its mosquito-host, the germ apparently goes through certain evolutions in the body of the non-immune, and, after the lapse of from three to five days, as a rule, brings about the attack of yellow fever. What the character of those evolutions are can only be surmised. We do know, however, that while the sojourn of the parasite in the body of the infected stegomyia may continue during at least two months without perceptibly affecting the longevity or the functional activity of its insect-host, its presence in the human host reveals itself only during a short number of days, disappearing, apparently by the end of the sixth day of the dangerous illness which it occasions, without leaving any other trace of its brief sojourn in the human host except the immunity which a first attack of yellow fever confers. The person thus immunized can thereafter receive with impunity the bites of any number of infected stegomyias and becomes incapacitated from contributing again to the perpetuation of the germ.

Since the first day of the attack of yellow fever (as early as the ninth hour in one of Dr. Carroll's cases), any healthy stegomyia that bites the patient is liable to become infected, so that a new life cycle will be opened for the germ in the newly infected stegomyia. Thus by alternately passing from the human to the mosquito-host and vice versa, the yellow fever germ has now lived during several consecutive centuries in tropical America, where both the aborigines and the European invaders belonged to susceptible races.

Now let us consider the probable character of the evolutions which the yellow fever germ undergoes in the body of the human host. Bearing in mind the fact that other two-host protozoa, such as the malaria parasite, lead during several consecutive months a parasitic existence, multiplying by schizogonia, forming schizonts, merozoits and, after a while, also gametes, in the body of their permanent host, and are unable to accomplish the sexual reproduction indispensable for the perpetuation of their species, unless they pass into the body of a second host (the Anopheles, in the case of the malaria parasite); bearing this in mind, are we not justified in supposing that the yellow fever parasite, being unable to accomplish this sexual reproduction in the body of its permanent mosquito-host, can only succeed in doing so by passing into the body of a non-immune human being after some of its elements have reached a stage of sexual differentiation corresponding to the gametes of malaria?

There is, moreover, another important consideration which may be adduced in support of this interpretation. The large tertian parasite, untreated, may continue for many months in the body of infected persons without immediate danger to the patient, whereas Grassi, I am informed, has found all the anopheles, in the Roman marshes, free from parasites during the winter season, so that all the infected ones must have died in consequence of their infection (corresponding to the phase of sexual reproduction of the parasite), and he attributes the renewal of the malaria epidemic in the following spring to the survival of the parasites in the human permanent host, in whose body only schizogonic phases are accomplished. This shows that the act of sexual reproduction is attended with more dangerous consequences for the host in which it is accomplished than are the various schizogonic phases of the same germ, a result which I had already surmised by reason of the greater metabolic changes which must accompany the sexual reproduction as compared with the schizogonic multiplication.

If it be admitted, therefore, that the penetration of the germ into the body of the non-immune is intended for the accomplishment of its sexual reproduction, and also that the analogy between it and the malaria parasite holds good, with the difference only that the latter accomplishes this act in the anopheles mosquito while the yellow fever germ does so in the human host, the following important inferences may be drawn.

The minimum number of days (estimated at 10 or 12 by the Yellow Fever Army Board) which must elapse, after the stegomyia has bitten a yellow fever patient, before the infected insect is able to inoculate the disease through its bites, must represent a series of transformations in the body of the contaminated mosquito, including:

(a) Introduction of young sporozoits sucked up with the blood of the patient.

(b) Growth of the sporozoits to adult age.

(c) Formation of schizonts and merozoits.

(d) Formation of gametes.

While, in the body of the non-immune, counting from the moment of his inoculation by the infected stegomyia, the following stages are likely to take place during the period of incubation:

(a) Localization of the gametes in appropriate sites.

(b) Fecundation of the macrogametes by the microgametes of the yellow fever germ.

(c) Formation of the oökinet and development of the oöcyst in appropriate cells (endothelial?).

(d) Discharge of free sporozoits of yellow fever into the circulating blood (perhaps too small to be recognized with the microscope).

(e) Development of the toxemic symptoms characteristic of the invasion of yellow fever, in the inoculated non-immune.

In calling your attention to this correlation of ideas, my object is not to make a display of fanciful conceptions, but simply to comply with my belief that unless we map out for ourselves some working hypothesis of this kind we shall continue groping in the dark, with little hope of completing our knowledge of the yellow fever etiology.

THE PRESENT STATUS OF THE URIC ACID QUESTION.*

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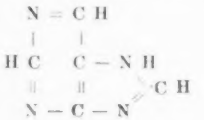
The work of recent years on uric acid metabolism has completely set aside the theory once universally accepted that in mammals uric acid is a product of the metabolism of all proteids, and an intermediary product in the formation of the end product urea. The acceptance of this theory rested on the comparison of proteid metabolism in mammals with that in birds and reptiles, and on the apparent parallelism between the excretion of uric acid and urea. In 1887 Mares[1] studied the hourly excretion of uric acid and urea after rich proteid meals, and found that the uric acid excretion reaches its maximum and returns to a permanent level four or

* A lecture delivered before the post-graduate students in medicine at the Johns Hopkins Medical School.

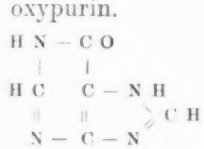
1. Mares: Arch. slav. de biolog., 3, p. 207, 1887.

five hours before the urea reaches its maximum. Evidence has gradually accumulated to show that uric acid is an intermediary product of a group of proteids which form only a small part of the total proteid material of the organism, a group consisting of the nucleins and their decomposition products, the xanthin or purin bases. Soon after Mares had demonstrated the lack of coincidence in the hourly excretion of uric acid and urea, Hirschfeld[2] found that on a diet which did not include meat, but substituted for it varying quantities of other proteid foods, no parallelism occurred in the daily excretion of uric acid and urea, but that the uric acid remained practically constant, while the urea underwent marked fluctuations, corresponding to the variations in the quantities of proteid food. Horbaczewski[3] in 1891 fed nuclein made from spleen pulp, and obtained a marked rise in uric acid elimination. This observation was followed by numerous experiments in which various organs rich in nuclear materials, such as the thymus, the liver, pancreas, spleen and the kidney, were shown similarly to increase the uric acid elimination. Lüthje[4] and Minkowski[5] made the same observation in dogs, and Brandenburg[6] obtained an increase in uric acid after enemata of thymus.

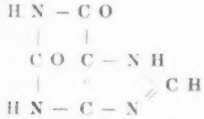
As Kossel had pointed out, nucleins yield, as decomposition products, the xanthin or, as Fischer has called them, the purin bases. The nucleins are substances which occur in cell nuclei, and consist of albumin combined with a nucleic acid. Nucleic acid contains in its molecule some one of the purin bases, and on decomposition splits up into this base and a phosphorus-containing portion. The purin bases, combined in the molecule of nucleic acid, are termed combined or bound purin bases; those which are uncombined are termed free. The bases which have so far been found combined in the nucleins are hypoxanthin, xanthin, guanin and adenin. These are closely related, chemically, to uric acid, together with which they are, according to Fischer, substitution products of a hypothetical substance which he termed purin, having this formula:



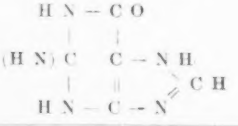
Hypoxanthin is 6. oxypurin.



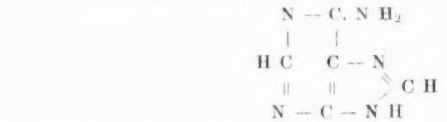
Xanthin is 2.6 dioxypurin:



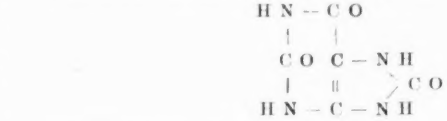
Guanin is 2. amino 6. oxypurin:



Adenin is 6. oxypurin:



While uric acid is 2.6.8 trioxypurin:



Hypoxanthin and xanthin, as may be seen, are oxypurins, while guanin and adenin are aminopurins.

Horbaczewski[7] had shown in 1888 that spleen pulp, which is rich in leucocytes, if allowed to undergo decomposition in the presence of oxygen, formed uric acid; if oxygen was excluded, it formed purin bases. This fact, and the close chemical relationship of uric acid to the purin bases, led a number of investigators to study the effect of the purin bases on the uric acid excretion. Strauss,[8] and later Jerome,[9] obtained a marked increase in uric acid excretion on adding beef extract to the diet, and Minkowski[5] gave hypoxanthin with the same marked result. The ability of the nucleins and purin bases to increase the uric acid output in the urine, therefore, appeared to be well demonstrated.

The converse side of the problem had, however, not been neglected. It had been noted by Mares, as well as by later investigators, that when the nucleins and purin bases were excluded from the body by starvation, the uric acid excretion was reduced much below the usual amount, but by no means disappeared. The same result was obtained by omitting from the diet meats of all kinds, soups, broths and all other substances containing nucleins and purin bases. On such a diet the uric acid became much less in quantity than on a mixed diet, just as was found during starvation, and after reaching a level remained constant from day to day, quite independently of changes in the amount of proteid in the food.

It seemed just to conclude from this that some constant source of production of uric acid exists in the body. In view of the relation between the feeding of foods rich in cellular elements and the consequent increase in the amount of uric acid in the urine, it seemed fair to assume that the continued excretion of uric acid, on a nuclein-free diet, was to be explained by the breaking down of cells and cell nuclei of the organism itself. The uric acid arising in this manner from the metabolism of the body tissues has been termed endogenous uric acid; that due to nucleins and purin bases introduced with the food, exogenous uric acid.

Based on the facts thus outlined, recent investigations, particularly those of Burian and Schur,[10] have determined more accurately the conditions which influence the normal excretion of uric acid from these two sources, and which will perhaps serve to form the starting point from which the pathologic physiology of uric acid metabolism may be rationally worked out. The essential fact, perhaps, on which our present conceptions of uric acid metabolism rests is the fixed value which, in a given individual following a given mode of life, the endogenous uric acid maintains. This uni-

2. Hirschfeld: Virch. Arch., 114, p. 301, 1888.
3. Horbaczewski: Monatsh. f. Chemie, 12, p. 233, 1891.
4. Lüthje: Ztsch. f. klin. Med., 31, p. 112, 1897.
5. Minkowski: Arch. f. exp. Path. u. Pharm., 41, p. 375, 1898.
6. Brandenburg: Berl. klin. Woch., p. 137, 1896.
7. Horbaczewski: Monatsh. f. Chemie, 19, p. 624, 1889.
8. Strauss: Berl. klin. Woch., p. 710, 1896.
9. Jerome: Jour. of Physiol., 25, p. 98, 1899.
10. Burian und Schur: Pflüger's Arch., 80 and 87.

formity is shown by the results of several observers who estimated at different periods during a number of months or years the amount of endogenous uric acid in the same individual. Thus Burian and Schur, at three different times in the course of eighteen months, found the endogenous uric acid in one individual to be 0.57 g., 0.60 g., and 0.60 g. Sivén[11] in his own case found 0.43 g. and 0.47 g. two months apart, and Kaufmann and Mohr[12] 0.558 g. and 0.525 g. six weeks apart.

As the figures quoted will suggest, the amount of endogenous uric acid is not the same for all individuals, but within limits varies with the individual and in a given individual with the amount of cell-destruction that is going on in the body, that is, with the amount of exertion to which he is subjected. Burian and Schur, by keeping individuals on a diet of milk, eggs and bread, or on a vegetable diet, have determined the endogenous uric acid in three cases, which excreted in twenty-four hours 0.54 g., 0.30 g., and 0.39 g., respectively. Kaufmann and Mohr found in four cases to which exactly the same diet was given 0.54 g., 0.31 g., 0.44 g., and 0.36 g. As referred to above, Sivén in his own case found 0.43 g. of endogenous uric acid; Krüger and Schmid[13] found 0.45 g., Mendel, Underhill and White[14] in two individuals found 0.35 g. endogenous uric acid excreted, Taylor[15] found 0.28 g., and Walker Hall[16] 0.48 g. The extremes in the daily amounts of endogenous uric acid in normal individuals are 0.2 g. and 0.7 g. According to Walker Hall this individual variation runs parallel to the body weight. In all of these determinations, the mode of life, the amount of work done by the individual, was kept constant, so that the maintenance of a uniform excretion of uric acid must be assumed to depend on this condition. In the way of direct proof Sivén has shown that more uric acid is excreted hourly during the hours of work than during the hours of sleep, and also that continuous rest in bed probably diminishes the amount of uric acid compared to that excreted during an active life. No observations have been made in regard to the amount of uric acid excreted during excessive muscular work.

When nucleins and purin bases have been eliminated from the diet variations in the amount of nitrogen metabolism have practically no effect on the uric acid excretion, nor is the condition of nitrogen equilibrium essential. Burian and Schur have shown that with an individual in nitrogen equilibrium excreting 16 g. of nitrogen per day, the uric acid varied between 0.58 g. and 0.54 g. When the nitrogen level was reduced to 9 g. per day, the uric acid remained almost exactly the same, varying between 0.54 g. and 0.56 g. On the other hand, Sivén also obtained a uniform excretion of endogenous uric acid in spite of a total failure to establish nitrogen equilibrium, and in spite of marked fluctuations in the amount of nitrogen taken into the body. In addition to these observations, it is also probable that variations in the number of calories contained in the diet produce no change in the endogenous uric acid, though some observers are inclined to think that an excessive number of calories tend to lower the amount of uric acid.

The quantity of endogenous uric acid eliminated in the urine is, therefore, peculiar to the individual, and varies with the amount of cell change going on in the organism, but is entirely independent of the general nitrogen metabolism and of the non-nitrogenous constituents of the food—in other words, provided the organism is normal, the endogenous uric acid is uninfluenced by the general metabolism.

The exogenous uric acid is an additional quantity of uric acid arising from the nucleins and purin bases introduced with the food. Accurate feeding has shown that the proportion of nucleins and purin bases excreted as uric acid represents a fixed percentage of the amount of purin bases, bound or free, taken in the food. On adding a definite quantity of hypoxanthin to an otherwise purin-free diet, Burian and Schur found that in man about 50 per cent. of the nitrogen contained in the hypoxanthin appeared in the urine as uric acid. Others have come to the same result, although there is some variation in the exact figures—Krüger and Schmid, for instance, recovering as much as 63 per cent. of hypoxanthin-N as uric acid-N. Of xanthin-N introduced, Burian and Schur found 43 per cent. to appear as uric acid-N. Guanin and adenin, on the other hand, when added to a purin-free diet, apparently cause no increase in the uric acid. Though Krüger and Schmid recently recovered 40 per cent. of adenin-N as uric acid-N, their result is open to question because of their method. Of these four purin bases, therefore, hypoxanthin and xanthin, which are oxypurins, increase the uric acid excretion, while guanin and adenin, which are aminopurins, fail to do so; that is, the free oxypurins may be oxidized to uric acid, while the oxidation of the free aminopurins results in other decomposition products.

If, however, these four purin bases be ingested by the organism as bound purin bases, combined in the nuclein molecule, the oxidation of guanin and adenin seems to follow other lines than when they are ingested as free bases. As bound bases both guanin and adenin also increase the uric acid elimination in certain definite proportions. Calves' liver, which contains bound hypoxanthin, causes an increase in the amount of uric acid-N equal to 50 per cent. of its contained hypoxanthin-N. Thus 500 g. of liver, which contain 0.6 g. purin-N (almost entirely hypoxanthin-N), cause an increase in uric acid-N of 0.31 g., equal to 52 per cent. of the hypoxanthin-N; 400 g. of spleen, containing 0.64 g. hypoxanthin-N, increase the uric acid-N by 0.33 g., also about 52 per cent. Of guanin, which is combined in the nuclein of the pancreas, about 50 per cent. is excreted as uric acid; Weiss[17] substituted 200 g. of pancreas for 200 g. of lean meat, making an increase of 0.146 g. in purin-N due entirely to bound guanin-N, and produced an increase of 0.072 g. in uric acid-N, equal to 49 per cent. of the additional guanin-N. Adenin is combined in the nuclein of the thymus, and so ingested causes an increase in uric acid which, however, is equivalent to only 25 per cent. of the total amount ingested. Burian and Schur on two successive days gave 620 g. of thymus, containing 2.48 g. of adenin-N, and recovered 0.6 g. as uric acid-N, or 26 per cent. Weiss recovered 22 per cent.

The aminopurins which can thus increase the uric acid output when combined in the nuclein molecules form an intermediate group between the oxypurins which, both bound and free, are oxidized to uric acid, and the methylated purin bases which are never con-

11. Sivén: Skan. Arch. f. Physiol., 11, p. 123, 1900.
12. Kaufmann u. Mohr: Deutsch. Arch. f. klin. Med., 74, 1902.
13. Krüger u. Schmid: Ztsch. f. physiol. Chem., 34, p. 563, 1902.
14. Mendel, Underhill and White: Am. Jour. Physiol., 8, p. 377, 1903.
15. Taylor: Am. Jour. Med. Sc., 118, p. 141, 1899.
16. Walker Hall: Manchester, 1902.
17. Weiss: Ztsch. f. physiol. Chem., 25, 1898.

verted to uric acid. The last, such as caffein (1.3.7. trimethyl-xanthin), and theobromin (3.7. dimethyl-xanthin) apparently cause no increase in the uric acid, but appear in the urine partly as such and partly as other purin bases. Though this has been the almost unanimous finding, Taylor has obtained a perfectly definite and unquestionable increase in the uric acid after the addition of coffee to a mixed diet, which was kept constant.

Uric acid, therefore, has two sources: First, the breaking down of cell nuclei of the body itself, which for each individual, under normal conditions, remains approximately constant, and, secondly, the nucleins and purin bases of the food which may vary greatly and produce corresponding variations in the uric acid output. The uric acid arising from the first source (the endogenous) varies normally, with the individual, between 0.2 g. and 0.7 g. in twenty-four hours. The uric acid arising from the second source (the exogenous) has been found to bear quantitative relations to certain of the purin bases introduced with the food, and to be entirely uninfluenced by others.

The question as to where in the body the purin bases undergo decomposition or oxidation has been approached in several ways, and has been best studied in dogs. Spitzer[18] has added hypoxanthin and xanthin to aqueous extracts of dog's liver and spleen, and found that in passing a stream of air through the mixture these bases were oxidized to uric acid. Guanin and adenin could also be oxidized in the same way, but to a much smaller extent. In dogs in which anastomosis had been made between the portal vein and the inferior vena cava, Hahn and Nencki[19] found the excreted uric acid greatly increased above the output before the operation. Beside the liver and spleen, other tissues, as the thymus and the voluntary muscles, are capable of oxidizing the purin bases to uric acid. While the liver is perhaps the chief tissue in which this decomposition takes place, the fact that it is not the only one is further demonstrated by the subsequent course of Hahn and Nencki's dogs, in which the uric acid excretion after remaining unusually high for a variable period, returned to normal. Here other tissues replaced the liver in disposing of the purin bases.

The decomposition of the purin bases is, however, carried beyond the stage represented by uric acid, and is effected by practically the same tissues and organs as the oxidation to uric acid, among which the liver is again the most important. Stokvis[20] many years ago showed that uric acid is destroyed by extracts of dog's liver. Chassevant and Richet[21] more recently isolated from such extracts an enzyme-like substance which decomposed uric acid, and Jacoby[22] found that by boiling the power to effect this decomposition was greatly diminished, thus strengthening the proof of its enzyme-like character. Ascoli[23] approached the subject in another way. He transfused isolated livers with defibrinated blood containing a known quantity of uric acid, and found a marked diminution in uric acid after the passage of the blood through the liver. In still another way Burian and Schur have demonstrated that the dog's liver is a very important point of destruction of uric acid. They isolated the liver and the kidneys from the circulation by ligating the aorta above the celiac axis, and found that whereas no uric acid could be demonstrated in the blood before this interference, a weighable quantity could be separated a few hours after the operation. With this well-proven activity of the liver in the dog, it is striking and a matter of importance that the kidneys are entirely inactive.

The herbivora form a striking contrast to dogs and other carnivora in the distribution of the tissues in which purin metabolism takes place. The oxidation of the purin bases takes place in the liver, spleen, thymus and other tissues. On the other hand, it has been found that extracts of beef liver could not decompose uric acid at all and that the liver in all herbivora acts only slightly. The kidneys, however, and in beef the muscles as well, decompose uric acid very rapidly. Thus, though the liver and some other tissues in the herbivora are able to oxidize the purin bases to uric acid, they can not carry the oxidation beyond this point, while the liver in carnivora can effect the complete oxidation. In man this accurate study has not been made.

The end product of the metabolism of purin bases, as far as man is concerned, is still a matter of doubt. For carnivora it has been shown by Salkowski,[24] and later by Mendel and Brown,[25] that uric acid was excreted largely as allantoin, while Minkowski[5] after feeding hypoxanthin to dogs recovered an amount of allantoin almost equivalent to the hypoxanthin which was not excreted as uric acid. Similar results have followed thymus feeding. In rabbits, on the other hand, uric acid introduced into the organism is partially excreted as glycocol. As this is decomposed to urea by the liver, it is possible that the portion of glycocol not excreted is so oxidized, and that urea forms at least one of the end products of uric acid decomposition.

It is, therefore, unquestionable that certain tissues in the mammalian organism can oxidize purin bases to uric acid, and that sometimes the same, sometimes other tissues, continue the oxidation of uric acid.

So far, only the fate of the exogenous purin bases has been considered. It has also been demonstrated, however, that the endogenous purin bodies, those arising from the metabolism of the organism itself, are similarly oxidized, and that the endogenous uric acid of the urine represents only the unoxidized portion of these. Burian and Schur have brought positive proof of this for the dog, and made it extremely probable for man. The blood of normal dogs contains no recognizable quantity of uric acid. Removal of both kidneys does not at all increase it. Only when the liver is at the same time isolated from the general circulation, that is, when the most important uric-acid-destroying organ is removed, does a measurable amount of uric acid appear. This occurs both when dogs have been kept on a purin free diet, and when they have been fed meat. Therefore, both the endogenous and the exogenous uric acid can be completely oxidized by the tissues when elimination is precluded by removal of both kidneys, and both accumulate in the blood when the uric-acid-destroying tissues are removed. Therefore, within the body as well as in isolated organs, uric acid represents only a stage in purin metabolism, and is not necessarily an end product. That a certain proportion of uric acid escapes oxidation, and is always contained in the blood, is obvious from the fact that when the means of its de-

18. Spitzer: Pflüger's Arch., 76, p. 392, 1899.
19. Hahn, Nencki, Massen und Pawlow: Arch. f. exp. Pathol. u. Pharm., 32, p. 161, 1893.
20. Stokvis: Arch. f. d. holl. Beitrage, 2 series, 2, p. 260, 1860.
21. Chassevant and Richet: Compt. rend. de la Soc. de Biol., 4, p. 743, 1897.
22. Jacoby: Virch. Arch., 157, p. 261, 1889.
23. Ascoli: Pflüger's Arch., 72, p. 340, 1898.
24. Salkowski: Ber. d. deutsch. chem. Gesell., 9, p. 719, 1876.
25. Mendel and Brown: Am. Jour. Physiol., 3, p. 261, 1900.

struction are removed it begins to accumulate in the blood. The uric acid which is found in the urine represents that portion of the uric acid in the blood which has been taken up and excreted by the kidneys. When a purin-free diet is given, the uric acid excreted, therefore, represents only a certain portion of the uric acid, which is formed by the breaking down of all nuclei, and enters the circulation. In dogs only about 4 per cent. of the uric acid injected subcutaneously is also eliminated to the extent of 4 per cent. If exogenous uric acid is excreted to this extent, and endogenous uric acid, as has been shown, exists in the blood, and, while the liver remains intact, may be destroyed just as is exogenous uric acid, there is no reason for doubting that it, too, is eliminated in the same proportion—that is, to the extent of 4 per cent.

When uric acid is injected subcutaneously in man, 50 per cent. is eliminated in the urine. This is the same proportion in which the hypoxanthin-N is eliminated. It may, therefore, be said that hypoxanthin is wholly oxidized to uric acid, and that of this one-half is eliminated as such. This means that a much larger proportion of uric acid reaches the kidneys in man than in dogs. Whether, in man, uric acid be increased in the blood when the means of elimination and decomposition are excluded from the circulation, can not be determined experimentally. From the identical behavior of the exogenous uric acid in dog and man, it is fair to assume that the endogenous uric acid in man is oxidized just as the exogenous uric acid and that the endogenous uric acid found in the urine is about one-half the entire amount found in the body. This, then, affords a criterion by which can be determined the ability of the body to take care of the purin bodies introduced into it or arising in it. If the exogenous and endogenous uric acid be controlled by the same conditions, as presumably they are, the degree to which the body can eliminate as uric acid ingested purin bases will at the same time indicate the extent to which the body can oxidize the uric acid arising within itself. This, therefore, forms a new method for the study of uric acid elimination in disease.

Uric acid, however, forms only a part, though under normal conditions by far the largest part, of the purin bodies eliminated in the urine, and should always be considered in its relation to the total quantity of purin substances in the urine. As has already been pointed out, certain of the purin bodies, the methylated purin bases, caffein, theobromin and others, do not ordinarily affect the uric acid excretion. They do, on the other hand, markedly increase the purin bases in the urine. It has been claimed by various writers that in certain diseases some of the exogenous and endogenous purin bodies are eliminated as purin bases at the expense of the uric acid, that is, that the latter forms a smaller proportion of the total purin bodies of the urine. Minkowski,[26] considering nucleic acid as a loose chemical combination consisting of adenin, guanin and nucleotin-phosphoric acid, suggests that "the end products of the metabolism of the purin bases may vary according to the organ in which the decomposition of the molecule of nucleic acid takes place, and the method by it occurs." By way of an hypothetical example, he adds that "by oxidation hypoxanthin may possibly arise directly from nucleic acid, and be easily oxidized; that by simple hydrolysis, on the other hand, only adenin is set free, the oxidation products of which retain the amido (NH_2) group instead of oxygen, and for this reason may have other effects on the organism." The effects on the organism of many of the purin bases has received very little attention. Walker Hall, however, has recently demonstrated that injections of hypoxanthin into rabbits, equal, weight for weight, to the quantity of purin bases usually ingested by man, cause degenerative changes in the cells of the liver and the kidney and produce changes in the intima of the smaller blood vessels.

In the light of the recent changes in the views concerning the physiology of uric acid, much of the work previously done on the elimination of uric acid in disease requires revision. Only the most recent observations have that accuracy which has been made possible by our better knowledge of the endogenous uric acid and of the quantitative relations between the excretion of exogenous uric acid and the amount of purin bodies introduced with the food. Of the latter point practically no application has as yet been made.

The study of endogenous uric acid in disease has not been carried far enough to warrant general conclusions. Inasmuch as the endogenous uric acid arises from the breaking down of cell nuclei, and, therefore, from nuclear nucleins, its relation to the phosphoric acid elimination has attracted some attention, the elimination of the two being parallel under normal conditions and in some diseases as well, notably in gout. The increase in all pathologic conditions in which an increased amount of tissue metabolism occurs has long been recognized. In all fevers, in diseases such as pneumonia, in which a cellular exudate is constantly thrown out and reabsorbed, in the primary anemias, in pernicious anemia in which blood destruction is constantly going on, and in leukemia in which a great number of leucocytes disintegrate, in the cachexias, and in other conditions—this increased waste results in an increase in the nucleins in the circulation to be broken down, and a consequent increase in the uric acid and purin bases eliminated. Uric acid may, therefore, be regarded as an index of the amount of cell destruction, of the amount of nuclear metabolic change, which is going on in the body.

The factors which control the deposition of uric acid salts in the tissues, as in gout—the retention of uric acid—have not been determined. It will be interesting to learn in what proportion the gouty individual eliminates as uric acid or purin bases known quantities of ingested purin substances. From a consideration of the phosphoric acid and nitrogen balances in gouty individuals between the attacks, Kaufmann and Mohr have obtained results which tend to show that the gouty individual has periods of retention and of elimination of phosphoric acid and nitrogen, which do not occur in normal individuals taking exactly the same diet (see also Futcher[27]). In the interval between attacks the endogenous uric acid, in the cases in which it has been determined, has been quite within normal limits. Whether the retention of uric acid which occurs just before and in the early part of the acute gouty attack represents a disturbance of purin metabolism only, or is part of a general metabolic disturbance, is still a matter of doubt. Woods-Hutchinson[28] has recently brought forward arguments which tend strongly to show that gout is a direct intoxication, entirely independent of

26. Minkowski: Deutsch. med. Woch., July 10, 1902.

27. Futcher: THE JOURNAL A. M. A., p. 216, 1897.

28. Woods-Hutchinson: Lancet, Jan. 31, 1903.

uric acid, the variations in which, as well as its deposition in the tissues, are secondary.

In nephritis, except when uremia develops, the uric acid excretion is probably more nearly normal than that of urea; that is, uric acid is probably more easily eliminated.

To summarize our present knowledge of the conditions which control the elimination of uric acid: The source of uric acid in mammals lies in the nucleins and their decomposition products, the purin bases. The uric acid eliminated in the urine arises partly from the nucleins and purin bases due to the breaking down of cell nuclei in the body itself, that is, the endogenous uric acid; and partly from the nucleins and purin bases contained in the food, the exogenous uric acid. The amount of endogenous uric acid excreted in twenty-four hours is the minimum which the individual normally excretes; it does not change in quantity, though it varies with individuals; it is influenced only by the mode of life, but in no way by the quantity or character of the constituents of food which do not belong to the group of nucleins and purin bases. The exogenous uric acid is always an addition to the endogenous uric acid, and depends in amount entirely on the quantity of certain purin bases contained in the food. Of the free purin bases only the oxypurins, hypoxanthin and xanthin, increase the uric acid elimination; of the bound bases both oxypurins and aminopurins increase the uric acid; the methylated purin bases do not effect the uric acid elimination, but increase the purin bases in the urine. Of the oxypurins, both bound and free, one-half is excreted in man as uric acid; of the bound aminopurins some appear one-half, some one-fourth as uric acid. The fraction is in each case independent of the individual, and is practically constant.

Uric acid is not an end product of metabolism, but is intermediary between the purin bases and some lower oxidation product which has lost the purin characteristics. This product may possibly be urea, but this is certainly unproven in man and only probably in lower animals. In the carnivora allantoin, in the herbivora glycocol, forms a large portion of the recoverable (recognizable?) oxidation products of uric acid.

What the relations of uric acid to gout may be has only begun to be worked out, but it is evident that it has very little to do with many of the pathologic conditions for which it has been unduly held accountable, and for which it can at best be regarded only as an index.

TUBERCULAR JOINTS AND THEIR TREATMENT.*

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The frequency of tubercular disease of the joints, and the necessity for early diagnosis, serve as an excuse for this paper on a subject about which so much has been written. The writer desires to emphasize the fact that the present article is intended only as a résumé of some of the more important well-proven and accepted conditions which make it an imperative duty of both the general practitioner and surgeon to be able to recognize a tubercular joint in its incipiency, for on our ability to diagnose this trouble early depends the success of treatment. We must recognize that joint tuberculosis is at first a local manifestation. We must disabuse our minds of the idea that it originates only in the children of tuberculous parents, and of the idea that all joint pain is rheumatic.

Tuberculosis in the region of a joint is essentially of the bone, although it may have originated in the synovial membrane. It is a disease of bacillary infection, which may occur from without or through the blood vessels. If the joint structure is in a healthy condition, the effect of the lodgement of these micro-organisms is *nil*. But, on the other hand, given some slight injury, or a cell weakness, the natural defensive power is weakened, the point of attack is fortified and we have the beginning of a disease process which, if not very early diagnosed and treated in the most radical way, finally results in abscess, necrosis, ankylosis, loss of limb or loss of life.

The irritation caused by the tubercle bacilli often excites inflammatory processes, and if staphylococcus infection is added suppuration ensues and the nodule may finally be gotten rid of; but suppuration is not to be regarded as an essential of a tubercular process. The action of bacilli is necessarily destructive, but by their presence phagocytosis immediately becomes active.

Tuberculosis of the joints may occur at any age, and is very frequent in children. The inflammation may begin either in the synovial membrane or the ossifying tissue of the head of the bone.

In the realm of causes we have lack of food and sunshine, foul air, etc., or the action of any process serving to lower the natural cell resistance of the part, and we have the onset of the disease. The general symptoms are rigidity, swelling, pain, flexion and disturbed relation as to length. After a very slight injury the child begins to limp, and remember this one symptom can never be regarded as a habit in a child, for it limps only from cause. A muscular atrophy takes place above and below some of the joints, making very prominent any hypertrophy that may exist. The pain is often characteristic, for it occurs in severe attacks at the instant the patient falls asleep, due, of course, to the momentary muscular relaxation and consequent approximation of the two ends of the inflamed bone. This, of course, is a symptom of a rather advanced state, but often we have a reflected pain, in knee, hip, abdomen, or chest, with altered contour of the body in various positions, the pain often at first only slight, possibly only a slight uneasiness or restlessness at night. This with the various other manifestations should serve as a warning signal to arrest our attention and cause us to make a most thorough investigation of the condition before us.

Flexion is also often an important symptom, and is associated with muscular rigidity, which is one of the earliest and most persistent symptoms of joint disease.

The writer is not unmindful of the difficulty sometimes encountered in a differential diagnosis of tubercular arthritis from the several other inflammatory diseases involving the joints. But it does seem that by a most careful analysis of the cases presenting to us distinct joint lesions we should be able in most cases to make a differential diagnosis.

The tendency of tubercular arthritis is toward destruction of the joint, with subsequent attempts at ankylosis of the two surfaces, either by bony or fibrous tissue, and frequently in a bad position. The patient, however, who is thus left to an uncertain nature, may die of a long-continued suppuration, the result of a mixed tuberculous infection before this process is completed.

* Read before the Mississippi Valley Medical Association.

We have in the tuberculin test a most certain agent in rendering a diagnosis possible. You are all no doubt familiar with its use for diagnostic purposes, so that I shall only treat of the most salient points to be observed in its use. The patient's temperature line and other conditions should be most carefully noted for two or three days prior to the injection, when the patient should again be carefully observed and a careful comparison of the temperature curve made. If we have a deposit anywhere, we get the tuberculin reaction—chill, fever, etc. If no reaction follows the injection within forty-eight or sixty hours, and we have reason to suspect the presence of the tubercular disease, then we are warranted in a second injection. The most perfect asepticity is to be observed.

The writer is aware of the dangers to be encountered from its employment, but does not consider them nearly so great as the evil consequences of a so-called expectant or do-nothing plan of treatment as a result of the uncertainty of early diagnosis in these cases. Of course, the dangers should be carefully considered and compared with the expected benefits to be derived by reason of a certainty in diagnosis before resorting to its use.

In coming to the question of treatment of this very prevalent disease it is the purpose of the writer to advocate a most radical plan, which should be adopted just so soon as a diagnosis has been made. He believes that the great majority of the varied and many kinds of expectant and waiting plans of treatment are unscientific, and not founded on facts. This statement is borne out by statistics which show a most unsatisfactory state of results. It may be safe to rely on rest, fixation of joint, fresh air, etc., for the first ten days or two weeks, provided an early diagnosis has been made. It is a mistake to delay active interference for weeks, depending on an already weakened and incapacitated nature to arrest the disease process, and our error is usually repaid by the formation of pus, bone necrosis, ankylosis, loss of limb, or possibly loss of life. If we but return for a moment to the pathology of this condition we must be impressed with the error of these older and generally accepted plans of treatment.

The surgical treatment of tubercular joints presents for our consideration the following operative procedures, according to the state of advancement of the joint involvement: Arthrotomy, arthrectomy, excision or resection, and amputation.

By the early and free opening of the affected joint, thus insuring free drainage, and thoroughly irrigating it with a hot normal saline solution, the writer has gotten some eminently satisfactory results. The irrigation should be repeated daily for a week or ten days, or even longer, according to the degree of involvement. Even where the process has gone to suppuration or beginning necrosis we may expect the most marked benefits from this plan of treatment, which is especially to be commended in all patients under 18 years of age, for by the more radical operations we may destroy the epiphyses, with consequent arrest of development or growth. However, in the advanced state of the disease, whether in the adult or the child, the more radical operations are not only advisable, but are imperatively demanded to save usefulness of limb, or at least limb if possible, and sometimes life. Where necroses with fistulæ have formed, their removal by arthrectomy or excision is to be insisted on. It is especially in the smaller joints that the most satisfactory results are obtained by arthrotomy and arthrectomy.

To recapitulate, the importance of an early diagnosis can not be overestimated. The early adaption of some of the radical means of treatment for this disease in its incipiency with eminently satisfactory results, seems to the writer to be founded on scientific reasons, especially so when we are brought face to face with the facts that a postponement of their application means that a little later on we are forced to adopt them when these same conditions have reached an advanced state of destruction, and that, too, with less satisfactory results. Finally, no surgeon not imbued with the fullest sense of his duty looking to the most perfect technic should attempt these radical operations.

DIPHTHERIA OF THE NOSE.

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Diphtheria of the nose will be here considered as a primary disease, and distinguished from the more common variety in which the diphtheritic inflammation of the nasal passages is secondary to diphtheria of the throat, or even from that form which is sometimes found in epidemics, in which the diphtheritic process originates in the mucous membrane of the nose, but soon appears in its usual form in the throat.

In its characteristics, diphtheria of the nose differs widely from diphtheria of the throat. The constitutional disturbances are frequently so mild that they attract little attention on the part of the patient, and in the majority of cases, the physician is appealed to only on account of the continued obstruction of the nostrils or the attending epistaxes. Renal and neurotic disturbances are rare, and paralysis of the velum palati, so frequently found in ordinary diphtheria, is not referred to in the literature on the subject. The absence of these complications is worthy of remark, on account of the greater absorbing capacity of the nasal mucosa as compared with that of the throat. We are all familiar, for instance, with the rapidity with which cocain is absorbed in the nostril and the greater tendency to constitutional disturbances than when this alkaloid is used in the throat.

In primary diphtheria of the nose, as in diphtheria of the throat, a fibrous exudate forms on the mucous membrane. This pseudomembrane may be removed, but the attempt is usually followed by bleeding and the membrane reforms. The constitutional disturbances are not marked, and resemble the first stage of an ordinary coryza. The main annoyance to the patient is the interference with nasal respiration and the discharge from the nose. Epistaxis is not uncommon, and frequently is the first symptom that attracts the attention of the patient or of the parents to the unusual character of the nasal affection.

As in diphtheria of the throat, the bacilli are located in the mucous membrane and do not spread through the system. The constitutional disturbance, when present, is due either to the local irritation, the absorption of toxins, or the effects of the interrupted or impeded nasal respiration.

The discovery of the Klebs-Loeffler bacillus has been of invaluable assistance in demonstrating that diphtheritic rhinitis is the same morbid process as diphtheria of the throat. Every case, in which a pseudomembrane is found in the nasal passages and which is not due to the application of the electrocautery or acids, should be examined for the Klebs-Loeffler bacillus.

In primary diphtheria of the nose, the early symptoms, as already stated, resemble to some extent those of an acute coryza, for which they are frequently mistaken. There is the usual elevation of the temperature, headache and general discomfort. In the first stages, the mucous membrane of the nostrils is congested as in a coryza, followed by, first, a watery and afterwards a mucopurulent discharge. A tendency to epistaxis develops later, being due to partial loosening of the pseudomembrane, the hemorrhages sometimes occurring several times a day.

This stage of nasal diphtheria is rarely seen by the physician, owing to its being mistaken for an ordinary "cold." When fully developed, a rhinoscopic examination shows the mucous membrane swollen and covered with a thick pseudomembrane, white or light gray in color, and which may be limited to a portion of one nostril or may cover the entire surface of both nasal cavities. In the early stages, one nostril only is involved, but later both show the results of the diphtheritic inflammation. If both nostrils are affected, the nasal respiration is much obstructed, and may even be entirely interrupted.

In mild cases, the healing process begins to assert itself by the second week, but may be prolonged to a much greater length, and sometimes as long as two months. In ordinary cases, there may be afterward found no result of the diphtheritic inflammation, but in aggravated cases, in which there has been loss of substance, this is followed by cicatricial tissue, and sometimes by synechia, which may interfere greatly with normal nasal respiration. Such aggravated cases are very rarely found in primary nasal diphtheria, the cases reported being complications of diphtheria of the throat, and then only in severe epidemics.

Primary diphtheria of the nose is so unusual an affection and ordinarily so mild in its character, that the ordinary methods of isolation are not always easy to enforce in the families where it appears. This also applies to the question of reporting such a case as an infectious disease to the board of health. I recall a case in which I had diagnosed diphtheria of the nose, and accordingly sent a culture to the state bacteriologist for examination. A positive report of the presence of the Klebs-Loeffler bacillus was sent me, the board of health at the same time, in accordance with the law, posting on the residence of the patient the white flag, indicating the presence of diphtheria. The father soon afterward called at my office in great excitement and objected strenuously to the flagging of the house. On my refusal to request the board of health to remove the flag, he showed me a certificate from his family physician certifying that he had examined the child and found it to be affected only with "simple catarrh." I am unable to state the subsequent history of this case, but it illustrates the effect of the rarity and mild effects of the disease, not only with the laity, but even with some members of the medical profession.

In making a bacteriologic examination of the nostrils in such cases, one negative result is not decisive. The duration of the disease is usually several weeks, and if the first result is negative, other cultures should be made before concluding definitely that the pseudomembranous process in the nose is not of a diphtheritic character. As an illustration of this, Concetti[1] reports a case in which the first bacteriologic examination was negative, but two weeks later the culture developed large colonies of the Klebs-Loeffler bacillus.

The prognosis in the ordinary form of nasal diphtheria is good, the cases usually making a good recovery. In the gangrenous form reported by some authors, however, the prognosis is very grave, and where septic disturbances have developed, it may be hopeless. Fortunately the latter cases are of extreme rarity.

My treatment of diphtheria of the nose consists simply in syringing the affected nostrils with a 25 per cent. solution of peroxid of hydrogen, this being followed by a free douching with the normal saline solution. Bichlorid and carbolic solution, recommended by some authors, should be avoided on account of the danger of the solution entering the stomach.

The question of the use of the diphtheria antitoxin in such cases is one on which I would invite an expression of opinion from the members of this Section. As already stated, the disease is usually so mild in its development, and sets up so little constitutional disturbances, that, from the standpoint of therapy only, it does not seem to be indicated as in the usual forms of diphtheria.

As to the influence of the antitoxin on the duration of the disease, I am not prepared to make a statement, although the point is an important one. While it is by no means as infectious as diphtheria of the throat, still the fact that the Klebs-Loeffler bacillus is found indicates possibilities of infection, and therefore a remedy which would shorten the duration of the disease without involving any special danger, should naturally be recommended. In regard to infection, however, I find but little stated in the literature on this subject, and, in the cases which have come under my observation, no second case has developed in the families in which I have been called on to treat the disease. This can not be due to the antiseptic character of the treatment, as in the majority of cases which I have seen, the diphtheritic rhinitis had existed for a number of days, thus giving ample opportunity for infection had there been any special tendency to it. Owing to the presence of Klebs-Loeffler bacillus, however, I always insisted on the same isolation as in the usual form of diphtheria.

1. Centralblatt f. Laryngologie, vol. viii, p. 503.

Resistance of Bacteria to Pressure.—Chlopin and Tammann, in the *Zeitschrift f. Hygiene u. Inf.-Kr.*, xlv, No. 2, 1903, report from Dorpat tests of the resistance of bacteria to pressure up to 13,000 kilograms per square centimeter, equivalent to 2,900 atmospheres. None of the bacteria was killed by this pressure, and one application produced scarcely any impression on them. But six repetitions of compression had an evident inhibiting action. Pneumonia and cholera germs are much less resistant than those of pseudo-diphtheria and anthrax, while yeasts are like the last, extremely resistant.

Intestinal Origin of Tuberculosis.—The *Klinisches Jahrbuch*, ii, No. 4, 1903, contains the report of extensive experimental and clinical experience bearing on the question of the intestinal origin of tuberculosis. The author, Nebelthau, states that in his material at Halle direct transmission of the tuberculosis from other persons was evident in all the cases in children. His experiments on animals showed that the tubercle bacilli were able to penetrate the intact intestinal wall, and induce lesions beyond, with no trace of their presence in the intestines. He found goats much more susceptible than dogs, and believes that children rank with goats in this respect. He advocates prophylactic measures to prevent transmission of both human and bovine tuberculosis by way of the respiratory apparatus and the digestive tract.

ACUTE, SUBACUTE AND CHRONIC INFECTIOUS OSTEOMYELITIS;

ITS PATHOLOGY AND TREATMENT*

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INTRODUCTION.

The object of this paper is to state the sequence of the changes which occur in the bones in infectious osteomyelitis; to emphasize the difference in the pathologic conditions which exist during the acute, subacute and chronic stages of the disease; and especially to suggest certain operations which are indicated by the pathologic conditions that exist during the different stages, and which generally are not appreciated. These operations, properly carried out, offer a very certain cure for conditions which, if allowed to persist, cause recurrent attacks of local infection or produce chronic and frequently incurable destruction of bone with permanent disability.

The statements made here are based almost entirely on personal work carried on for the past eight years. The work has included examination of pathologic material obtained from operations or necropsies on cases occurring at the Boston City Hospital and the Children's Hospital, experimental work at Harvard Medical School, and clinical cases, most of which were seen during my own tour of duty at the Boston City Hospital. A few other clinical cases have been furnished by the great kindness of my colleagues on the hospital staff, who have allowed me to see the patients and present the records of the cases.

DEFINITION.

Infectious osteomyelitis is an acute suppurative inflammation of the bone, and is always due to infection of the bone marrow by pyogenic microörganisms. The process is essentially like the process seen in a furuncle, and has been graphically called "bone furunculosis," although the process in bone is somewhat modified by the peculiar anatomy of the tissue. In bone, the process begins in the marrow of the alveolar spaces, which communicate freely with each other, but are enclosed by a dense shell of cortical bone. Hence the process, at first circumscribed, may quickly involve the entire marrow of an infected bone, because the products of bacterial infection are retained within a shell of dense bone, and the primary focus can be reached only by an extensive bone operation.

CAUSE.

The direct cause of acute infectious osteomyelitis is always an infection by some pyogenic bacterium. The organism which most frequently is the cause is the *Staphylococcus pyogenes aureus,* e. g., Lannelongue[1] and Achard[2] found that of 130 cases of osteomyelitis 103 cases gave a pure culture of that organism. In some thirty primary cases of my own all but four were due to the same organism. The staphylococcus produces, as a rule, the most typical and extensive bony destruction. Sometimes the *Staphylococcus albus* or *citreus* is present in pure cultures, and Lexer[3] says that the character of the lesions is the same as that of those produced by the aureus, and the lesions can not be distinguished clinically. The bone lesions frequently are secondary to suppurative lesions elsewhere in the body, e. g., furuncle or carbuncle, and the organisms are carried to the bones by the blood.

In a few cases the infectious organism is the *Streptococcus pyogenes.* In some cases the lesions produced by the streptococcus are like those produced by the staphylococcus and can not be distinguished clinically, but these cases are rare.[3] As a rule, the streptococcus has a tendency to affect the joints, to cause separation of an epiphysis, or to attack the superficial portion of the bone and cause a periostitis rather than a diffuse osteomyelitis. Such bone infections frequently occur in infants from mothers with septicemia, and may be due to infection during delivery. Or they may be secondary to phlegmon or erysipelas. Osteomyelitis produced in young animals by inoculation with streptococcus does not differ from that produced by the staphylococcus.

In still other cases[4] Fränkel's pneumococcus causes osteomyelitis. The appearance and distribution of the lesions vary, but on the whole the tendency is the same as in the case of the streptococcus, i. e., to a superficial or joint infection. These cases may occur secondary to pneumonia, pleurisy, or empyema, or the point of primary infection may be hidden.

* Read at the Fifty-fourth Annual Session of the American Medical Association, in the Section on Surgery and Anatomy, and approved for publication by the Executive Committee: Drs. A. J. Ochsner, J. E. Moore and De Forest Willard.

1. Lannelongue: Statistique Microbienne de l'Ostéomyélite Aiguë. Rev. de Chir., 1895.
2. Lannelongue and Achard: Sur la Présence du Staphylococ. Citreus dans un Ancien Foyer d'Ostéomyélite. Arch. de Med. Exper. et d'Anat. Path., 1892.
3. Lexer, E.: Die Aetiologie und die Mikro-organismen der akuten Osteomyelitis. Volkmann's Klinische Vorträge, N. F., 173, p. 659.
4. Fischer and Levy: Bacteriolog. Befund bei Osteomyelitis und Periostitis, Deutsch. Zeitschr. f. Chir., 1893.

Not infrequently the typhoid bacillus may cause suppurative areas in bone, and Keen[5] has collected thirty-eight such cases, in fourteen of which the bacillus was present in pure cultures. As a rule, such lesions are of small extent and superficial and the destruction of the marrow is slight unless a secondary infection with some pyogenic organism occurs. The cases generally occur quite late in the course of typhoid fever.

As a rule, the infecting organism is present in pure culture, but sometimes a mixed infection occurs, and such cases are said to be especially severe. In cases of chronic osteomyelitis with open sinuses and exposed bone a great variety of organisms, pathogenic and saprophytic, may be present. In one such case with a very foul-smelling discharge, I found the *Bacillus fetidus.* Secondary infections with the colon bacillus, the pyocyaneus and anthrax have been reported.

Therefore, infectious osteomyelitis is not a specific disease, but is an acute inflammation of bone that may be produced by any one of a variety of pathogenic organisms, or by a mixed infection. Any[3] pyogenic organism which can be carried in the blood stream may be deposited in the bone and produce suppuration. Some show great tendency to such an action, others but little; some settle by preference in the bone marrow, others at the periphery in the periosteum or in the joints; some tend to act at the point of greatest bone activity, others at points of injury.

Experimental Proof.—This has been proved by experiments on animals by many observers. Characteristic osteomyelitis has been produced in the bones of animals by injection of pyogenic organisms into the nutrient arteries of the bones, or by direct injection of organisms into bone marrow, or by fracturing bones and inoculating animals subcutaneously. For such inoculation experiments the *Staphylococcus pyogenes aureus,*[6] the *Streptococcus pyogenes,* the pneumococcus and the typhoid bacillus have been used. Ackermann[7] has produced it by injecting large numbers of the colon bacilli. Ullman produced "sterile abscesses" in bone by injecting an emulsion of calomel directly into the marrow. The gross and microscopic appearance of the experimental lesions was the same, no matter what the cause.

PREDISPOSING CAUSES.

Certain general causes favor the occurrence of osteomyelitis. The disease usually occurs in individuals whose bones have not attained complete development, i. e., in children or adolescents, although it is not rare in adults, and sometimes occurs in advanced life, as shown in a case reported by Bottomley.[8] About one-half of the cases occur between the ages of thirteen and seventeen, although young children often are infected. The disease is said to occur in boys about three times as often as in girls. The disease frequently appears after extreme fatigue, or exposure to cold or wet. One of the cases mentioned later came on within a few days after bathing in cold water in early spring. Injuries of moderate severity, e. g., contusions of bones, frequently precede the disease by so short a time as to suggest a possible cause, although there may have been no break in the skin. A preceding attack of some infectious disease is often noted, e. g., measles, scarlet fever, pneumonia, or frequently typhoid fever. Osteomyelitis which follows infectious diseases usually is due to a secondary infection by some pyogenic organism, e. g., staphylococcus, although both the pneumococcus and the typhoid bacillus may be the direct cause of the bone lesion. The frequent occurrence of osteomyelitis subsequent to the exanthemata probably is due to lowered resistance to bacterial infection as a result of the infectious disease, as well as to the septicemia frequently present in those diseases. Mallory has shown that in smallpox[9] and typhoid fever[10] areas of necrosis are frequently present in the bone marrow, and such areas, secondarily infected by pyogenic organisms, may well be the starting points of acute suppuration of the marrow.

Compound fractures frequently become infected by pyogenic organisms, and the bone undergoes osteomyelitic changes. In former days such infections frequently were fatal. Under modern methods the infection when it occurs generally is slight, and, since the pus usually can readily escape through the wound in the soft tissues, the results are seldom fatal, although the destruction of bone by the infection may be sufficient to greatly delay healing, and to lead to the formation of small sequestra and enduring sinuses. Sometimes the same result follows infection of bone stumps after amputations.

METHOD OF INFECTION.

The infection of the bone often is secondary to a local infection in some other part of the body, e. g., furuncle, paronychia or chronic ulcer, and the organism carried from such a focus by the blood produces infection of the bone marrow. In some cases the organism enters the body through the respiratory tract, as when an osteomyelitis produced by the pneumococcus occurs subsequent to a pneumonia, pleurisy or empyema. Infection may occur through the intestinal tract, as when osteomyelitis is produced by the typhoid bacillus, although other types of intestinal infection are said to be rare. Ullman[6] fractured the bones of animals and then fed them with infected food, but failed to produce infection of the bone. Frequently the osteomyelitic focus appears to be the only point of infection and it may be quite impossible to detect the primary point of entrance of the infective organism.

LOCATION.

Osteomyelitis nearly always begins in the diaphysis of the long bones, usually near the epiphyseal line. This is in sharp contrast with tuberculosis of bone, which, in the large bones at least, practically always begins in the epiphysis. Rarely, however, osteomyelitis is said to begin in the epiphysis, and so to simulate acute tubercular disease. It is my belief that such cases usually begin

5. Keen: Surgical Complications and Sequels of Typhoid Fever, 1898.

6. Lexer: Experiment. Erzeugung osteomyelitischer Herde. Dtsch. Med. Wochenschr., xvi, 1894; also, Ullman: Beiträge zur Lehre von der Osteomyelitis acuta. Wien.

7. Ackermann: Lésions Ostéomyélitiques provoquées par le Bact. Coli Comm., Arch. de Med. Exp. et d'Anat. Path., 1895.

8. Bottomley, J. T.: Acute, Non-traumatic Multiple Osteomyelitis Due to the Streptococcus in an Adult, THE JOURNAL A. M. A., July 25, 1903.

9. Mallory, F. B.: Ueber die Verbreitung der Osteomyelitis variolosa im Knochensysteme., Zeitsch. f. Heilkunde, vol. xv, 1894.

10. Mallory, F. B.: A Histologic Study of Typhoid Fever, Jour. Exp. Med., iii, p. 611, 1898.

in the diaphysis, perforate the epiphyseal line very early, and then extend to the joint. The femur and the tibia are the bones most frequently attacked, then the humerus, but no bone is exempt, and short long bones, e. g., the phalanges or flat bones, may be affected. Usually only one bone is diseased, but sometimes several bones are affected. After one bone is diseased other bones may become involved after an interval of days or weeks. Multiple osteomyelitic lesions are, however, not common.

PATHOLOGIC PROCESS.

The primary area of infection is always, apparently, in the bone marrow. The bony trabeculæ and the cortex are destroyed only secondarily, and their destruction and solution is usually slight in the early stages, although in the later stages the destruction may be very extensive. The process almost always begins in the diaphysis of the long bones, frequently near the epiphyseal line. Rarely, however, the process is said to begin in the epiphysis, and then may extend into the adjacent joint early. After the organisms gain access to the marrow cells they multiply and produce a soluble toxin which causes necrosis of the adjacent marrow cells. Since the cortex is relatively impermeable while the marrow spaces allow free communication and extension of the infection, necrosis of a very considerable portion of the marrow of a long bone may take place before marked purulent infiltration occurs. In such a case the marrow may appear gelatinous and injected to the naked eye, while under the microscope the marrow cells everywhere are necrotic, and among them are numerous colonies of the infecting organism. As a rule, purulent exudation of polynuclear leucocytes with extensive solution of marrow cells appears early. Then the bone is, on being sawed open, mottled with numerous yellow or greenish areas of suppuration, together with reddened areas of injection or hemorrhage. Solution of the soft tissue of the marrow is usually great. Sometimes even in the early stages there is some solution of bony trabeculæ, with the formation in the spongy bone of cavities containing serum, necrotic cells and leucocytes. Hence "bone abscesses" appear, but these usually are small. The infection may very rapidly extend along the entire marrow canal of a long bone. The extension, however, is always more or less irregular, apparently because of the irregular communication between adjacent alveolar spaces, due to the irregular arrangement of the bony trabeculæ, so that the bone nearly always shows a mottled red and yellow appearance from the presence of necrotic and injected and purulent areas, while small areas of relatively unaltered marrow may persist in close proximity to the altered areas.

The infection usually extends quite early through the dense cortical bone, probably along the haversian canals, and produces an inflammatory exudation and suppuration between the periosteum and the outer layer of cortical bone, i. e., a subperiosteal abscess, and may strip the periosteum from the bone over a great extent or completely. The infection may also extend to adjacent soft tissues, and cause myositis, or a subcutaneous inflammation, or an abscess. Such an abscess may be very extensive, and has direct communication with the marrow of the bone, although the point of communication may not be detected readily. Finally such an abscess may extend to the surface and break through the skin at one or more points, although such an event rarely occurs spontaneously in severe cases, since fatal toxemia and septicemia frequently occur before spontaneous evacuation. If such a spontaneous evacuation does occur, sinuses leading down to dead bone may persist indefinitely.

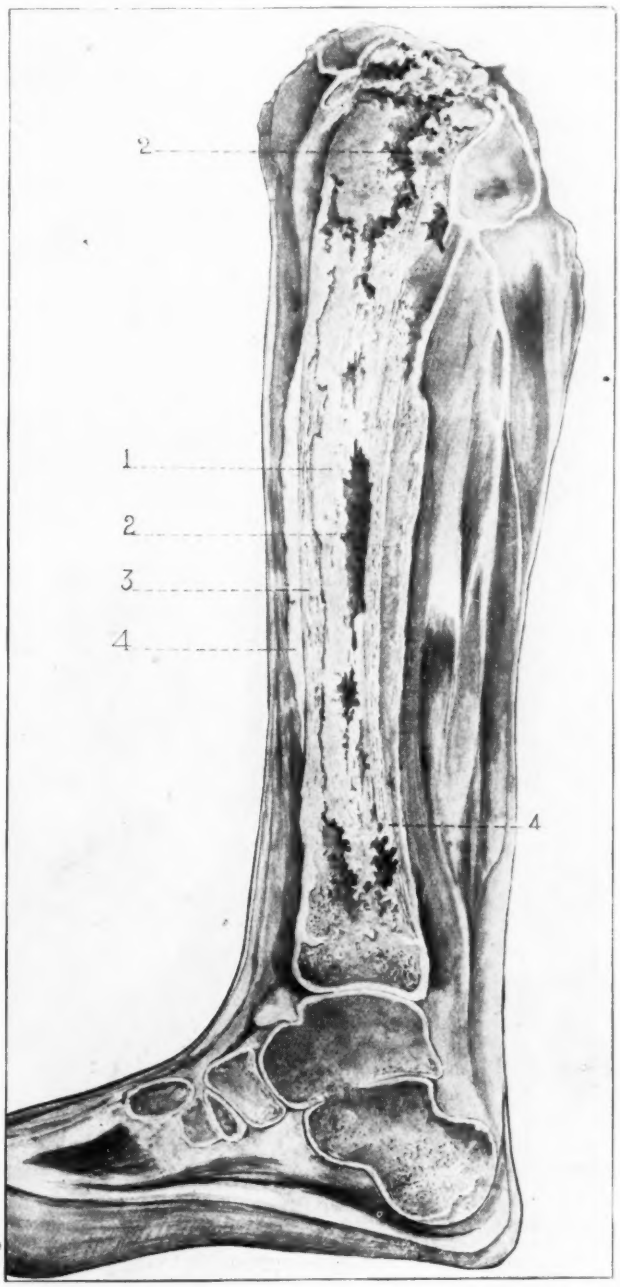

Figure 1.—Vertical antero-posterior section through the leg and foot of a case of infectious osteomyelitis. Duration about seven weeks. 1. Areas of suppuration. 2. Areas of injection and granulation tissue. 3. Necrotic cortical bone. 4. Newly-formed periosteal bone, but still plastic. This is the best stage for the operation. Upper epiphysis invaded by suppuration. Below process checked by epiphyseal line.

As a rule, the infection is checked and confined to the diaphysis by the epiphyseal line. In some cases, however, especially in older children or adults in whom the epiphyseal line is partly or completely ossified, the infection extends through the epiphyseal line, involves the

epiphysis, and then may extend to the joint and produce a purulent inflammation of the synovial cavity and more or less complete destruction of the joint. Or there may be a destruction of the epiphyseal line and a separation of shaft and epiphysis—"spontaneous fracture."

The cortical bone usually becomes necrotic over considerable areas. The extent to which cortical necrosis occurs depends partly on the extent of the destruction of the endosteum and partly on the amount of separation of the periosteum from the shaft. If the periosteum is stripped from the cortical bone for any great extent, internally, the entire circumference of the endosteum is destroyed, the entire inner circumference of the cortex may become necrotic, at least in its inner layers. If periosteum and endosteum both are affected at any given level, a complete necrosis of the shell of cortical bone may occur. Since the amount of destruction of the endosteum and the extent of the stripping of the periosteum vary greatly in individual cases, the extent of necrosis of the cortical shell also varies within very wide limits. Sometimes the entire shaft of cortical bone may be destroyed relatively early in the disease. In other

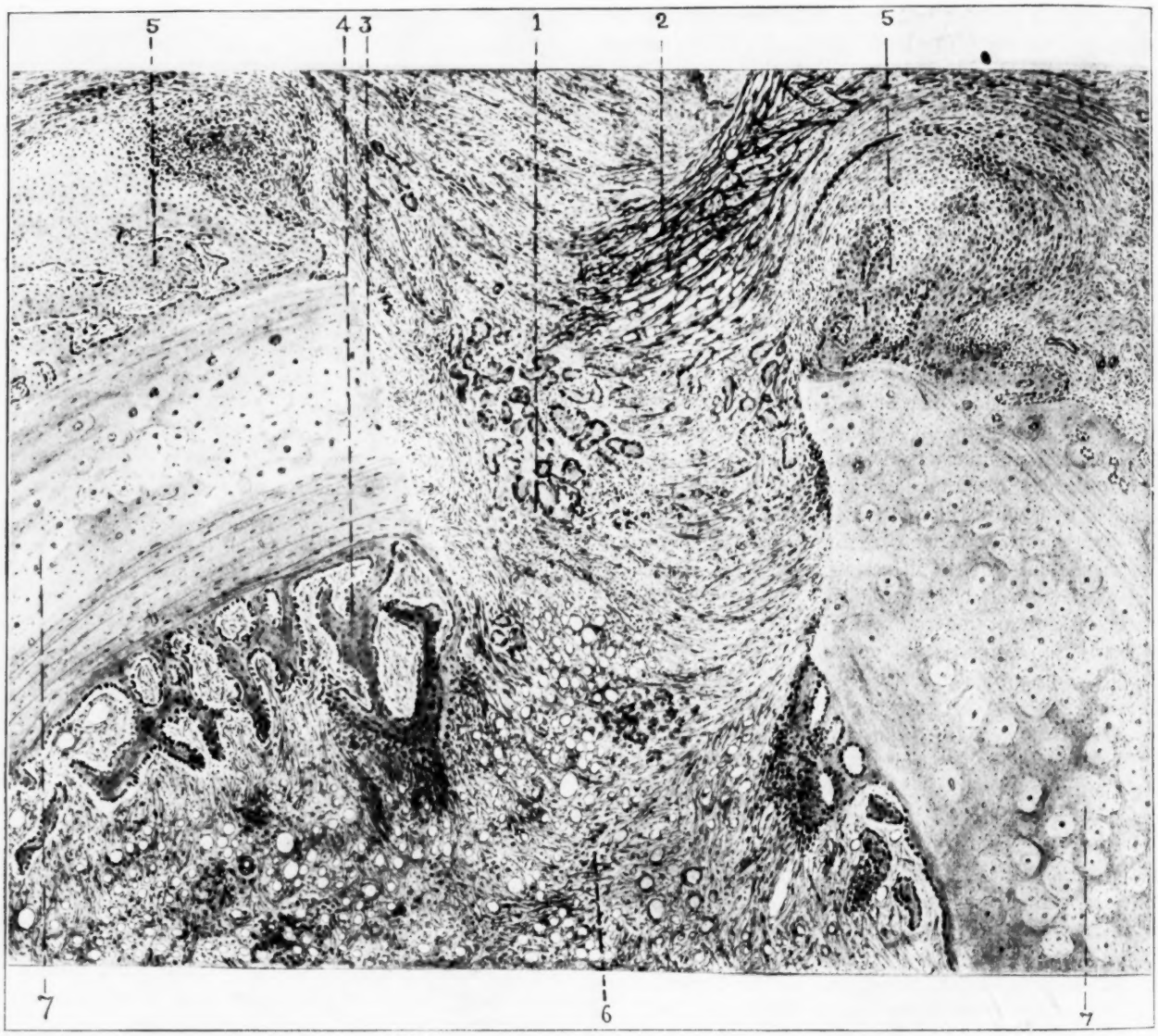

Figure 2.—Transverse section through a vertical drill hole in femur of a rabbit. Eight days' duration. 1. Drill hole filled with loose fragments of bone and granulation tissue. 2. Remnant of fibrin from inflammatory exudate. 3. Margin of drill hole in cortical bone; no proliferation of this dense bone. 4. Internal callus, arising from endosteum. 5. 5. External callus arising from periosteum, partly preformed cartilage, and partly direct bony formation. 6. Scar tissue in narrow canal, coming chiefly from reticulum of marrow. 7. 7. Cortex of femur.

necrosis of at least the outer layer of the underlying cortical bone is likely to occur. On the other hand, if much of the endosteum which lines the shaft and covers the trabeculæ is destroyed by the inflammation, a corresponding necrosis of the inner layers of the cortex or of the trabeculæ will occur.

If the periosteum is separated from the cortical bone about its entire circumference, as frequently happens in these cases, necrosis of the entire circumference of the cortex, at least in its superficial layers, may occur. If, cases only a long sliver of the outer layer of the cortex may become necrotic, and ultimately be separated as a sequestrum, without opening into the marrow cavity.

In nearly all cases, because of the impermeability of the cortical bone and the consequent rapid extension of the suppuration over a large extent of marrow, the area of suppuration from which absorption takes place is large, the difficulties in the way of spontaneous or artificial evacuation are great, while symptoms of toxemia and septicemia appear early and are extreme.

REPAIR.

If from spontaneous evacuation of the abscesses, or from operation, a fatal result is avoided, the infectious process may become limited and the process of repair may begin. The reparative process produces peculiar and important gross pathologic conditions, due to the peculiar anatomic conditions found in bone. In general, repair within the shaft is brought about by the formation both of granulation tissue which arises from the reticulum of the marrow, and of new bone which arises from the endosteum. As a rule, a portion of the infected marrow and cortex becomes necrotic over a greater or less extent and persists, for a time at least, as a bony "sequestrum." Outside of the shaft the periosteum becomes more or less separated from the underlying necrotic shaft, proliferates, and produces a shell of new bone, which surrounds the necrotic original shaft with a shell of new bone,, i. e., forms an "involucrum." An understanding of each of these steps demands an accurate consideration of the process of repair of normal bone, as studied in experimental lesions in animals.

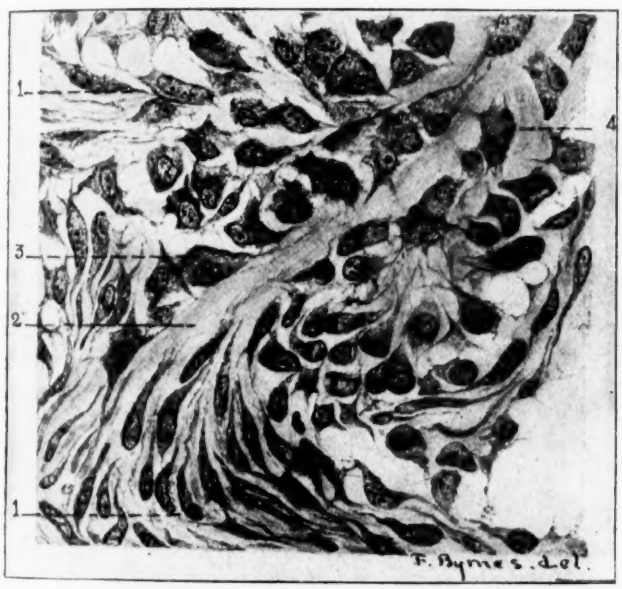

Figure 3.—High power of cells derived from endosteum showing formation of early osteoid trabeculæ. 1, 1. Epithelioid cells, with fibrillar intercellular material. 2. Intercellular material becoming homogeneous, previous to deposit of lime salts, "osteoid" trabecula. 3. Epithelioid cell on surface of osteoid trabecula, "osteoclast." 4. Epithelioid cell retained in osteoid trabecula, to become "bone corpuscle."

REPAIR OF UNINFECTED EXPERIMENTAL FRACTURES.

The process can best be studied in bones in which a loss of bony tissue is produced without dislocation of the fragments, e. g., by drilling a small hole vertically into the bone. In this way the process of repair can be studied without the complications which arise in complete fractures.

In such fractures hemorrhage occurs, followed in a few hours by an inflammatory exudate. By the second day reparative proliferation occurs. The proliferation occurs within and outside of the cortex of the bone. The external proliferation arises from the periosteum, and consists of a mass of epithelioid cells, which soon become spindle-shaped and are accompanied by young blood vessels derived from adjacent blood vessels. This mass of cells forms the early "external callus." The internal proliferation arises partly from the layer of cells lining the inner surface of the cortex (endosteum) and partly from the connective tissue reticulum of the marrow, and forms a mass of cells in the shaft similar to those produced by the periosteum. This mass of cells forms the early "internal callus." By the fourth day a homogeneous intercellular substance appears between some of the cells of the internal callus, the early "osteoid" tissue. Fusion of adjacent areas of such osteoid tissue forms the early outline of new trabeculæ in the internal callus. Some of the proliferated cells are included in the osteoid areas, and are converted into the bone corpuscles of the osteoid trabeculæ, while others of the cells assume a polygonal shape, persist at the periphery of the trabeculæ and take on the function of depositing bone, i. e., become "osteoblasts." The cells which carry on these functions apparently are derived from the cells which arise from the endosteal cells, although in the early stages they can not be distinguished morphologically from the fibroblastic cells derived from the connective tissue reticulum of the marrow. Ultimately there comes a deposit of lime salts in the osteoid trabeculæ of the internal callus, and so the bony trabeculæ are formed. Besides the proliferation of endosteal cells there is a proliferation of the connective tissue of the marrow reticulum, and fibroblastic cells, which ultimately forms a scar within the cortex, are produced. New blood vessels arise from preëxisting blood vessels.

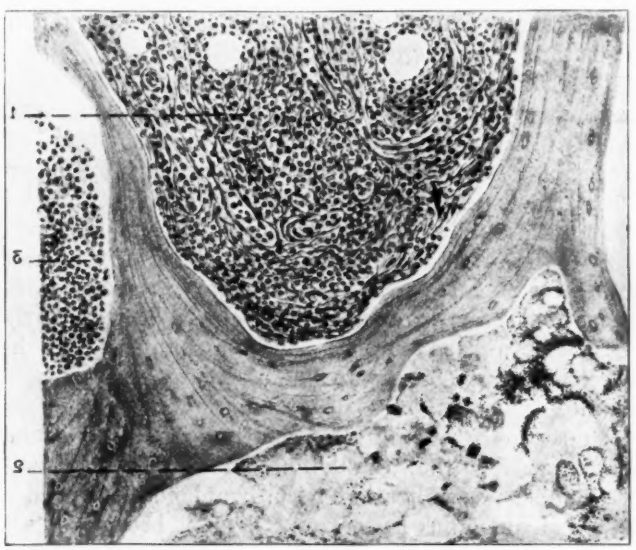

Figure 4.—Adjacent alveolar spaces in marrow of osteomyelitis of tibia, duration about ten days. 1. Alveolus filled with granulation tissue. 2. Alveolus filled with serum and entirely necrotic cells, among which are numerous colonies of staphylococci. 3. Alveolus filled almost entirely with polynuclear leucocytes.

A formation of bony trabeculæ in the external periosteal callus takes place in an exactly similar way.

The cortical bone in experimental fractures seems to have very limited or no power of proliferation, and the space in the cortical bone at first is filled with hemorrhage and exudation only, until the external and internal calluses project in from either side, meet, and fuse. After the fusion, new trabeculæ appear in the gap in the cortical bone. These are at first entirely free from the cortical bone, but finally become fused

with the calcified portion of the cortex and thus form the "intermediate callus."

At first the newly-formed osteoid or osseous tissue is very vascular and formative osteoblasts are numerous. Later the blood vessels are much less numerous, the cellular elements are fewer, and the trabeculæ become laminated and have the same appearance as in normal bone.

REPAIR IN OSTEOMYELITIS.

The general process in the repair of osteomyelitic bone is the same, but some of the special steps are modified by the degree, extent and character of the destructive process and by the persistence of the sequestrum. The steps will be described as they occur in the marrow, the cortex and the periosteum. It should be borne in mind that the endosteum covers all of the calcified trabeculæ as well as the inner cortical wall.

Marrow.—As has been mentioned, adjacent marrow spaces in the early stages may be normal, or show slight necrosis with little leucocytosis, or may be entirely necrotic, or the cells may be dissolved and the space filled with purulent exudation. Consequently the amount of proliferation in adjacent spaces after repair begins may vary a great deal.

The connective tissue of the reticulum of the fat marrow may proliferate to a great degree, and surround purulent areas with a more or less complete zone of granulation tissue, or in some cases may entirely fill up the marrow spaces at a given level, and so form a band of at first granulation, later dense scar tissue, thus separating the necrotic and infiltrated portion of the shaft from the sound portion. In a case of spontaneous osteomyelitis the scar tissue is likely to be irregularly distributed throughout the shaft surrounding the infiltrated areas. In compound fractures especially a definite transverse zone of granulation or scar tissue often separates the infected portion from the sound shaft. At first the granulation tissue may be edematous and show infiltration with lymphoid and plasma cells and numerous leucocytes. Later it becomes dense scar tissue. If a definite abscess has formed, it may be completely surrounded by a zone of scar tissue.

Beside the proliferation of connective tissue from the reticulum there may be a proliferation of the endosteum both from the inner wall of cortical bone and from the endosteum covering any of the trabeculæ. This may lead to a deposit of bone on the inner wall of the cortex, and to a thickening of the bony structure of the old trabeculæ, or to the formation of new trabeculæ. If such endosteal proliferation takes place it leads to a thickening of old bony structures and a formation of new ones which may surround infiltrated or necrotic areas with a wall of bone of increased density, or form a barrier of bone between necrotic and sound portions of the shaft; or, if the abscess is a local one, may entirely surround such an abscess, or may lead to an obliteration of the marrow canal at a given point.

Since the extension of the destructive process is very irregular, the distribution of the granulation tissue and endosteal bone may be correspondingly irregular, and may be diffusely scattered throughout the bone, may cause bony or fibrous encapsulation of diseased areas, or may divide diseased areas from sound portions of the shaft.

Cortex.—As has been said in discussing the repair of experimental fractures, dense cortical bone has very little or no power of direct repair. Repair of any considerable amount of necrosis of cortical bone depends entirely on the integrity of the endosteum within, and the integrity and adhesion of the periosteum to the outside of the cortical bone. If the endosteum is intact, the inner layer of the cortical bone may retain its vitality. In some cases in which the periosteum is entirely stripped from the underlying cortex, the cortex at the time of

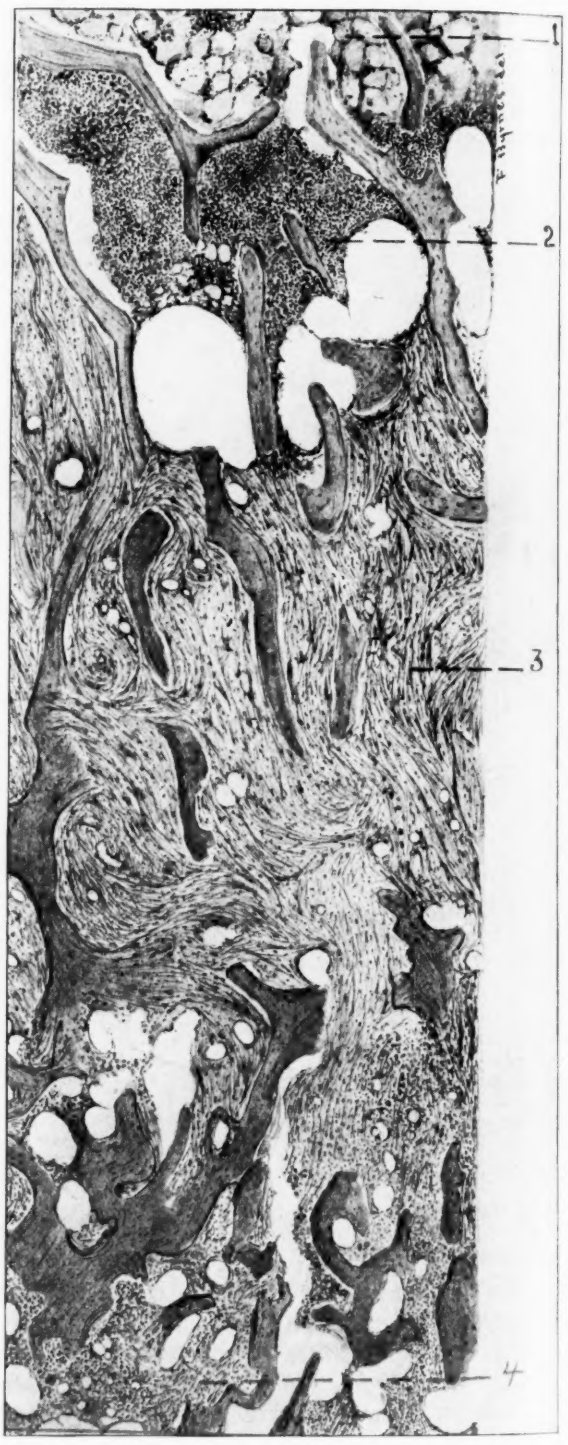

Figure 5.—Vertical section through an osteomyelitic compound fracture. 1. Alveolar spaces filled with necrotic cells and serum, with many colonies of staphylococci. 2. Zone of polynuclear leucocytes in alveolar spaces. 3. Zone of scar tissue filling alveoli and separating infected bone from (4) normal red marrow and granulation tissue in alveoli.

operation may appear white, non-vascular and necrotic; but if the pus is entirely removed, it is certain that to a considerable extent the periosteum returns to its normal position, becomes adherent to the apparently necrotic cortex and maintains or renews its vitality. This adhesion of periosteum may be complete over the entire shaft, or more commonly takes place over only a part of the shaft, and fails to take place in other portions. This partly explains the occasional very irregular distribution of the necrosis of the cortical bone as seen in some sequestra.

The necrosis and inability to repair of the cortical bone is the chief cause of the persistence of sequestra and sinuses as seen in chronic osteomyelitis. The marrow has considerable power of repair, but the cortex, if necrotic, persists as a sequestrum, and either remains

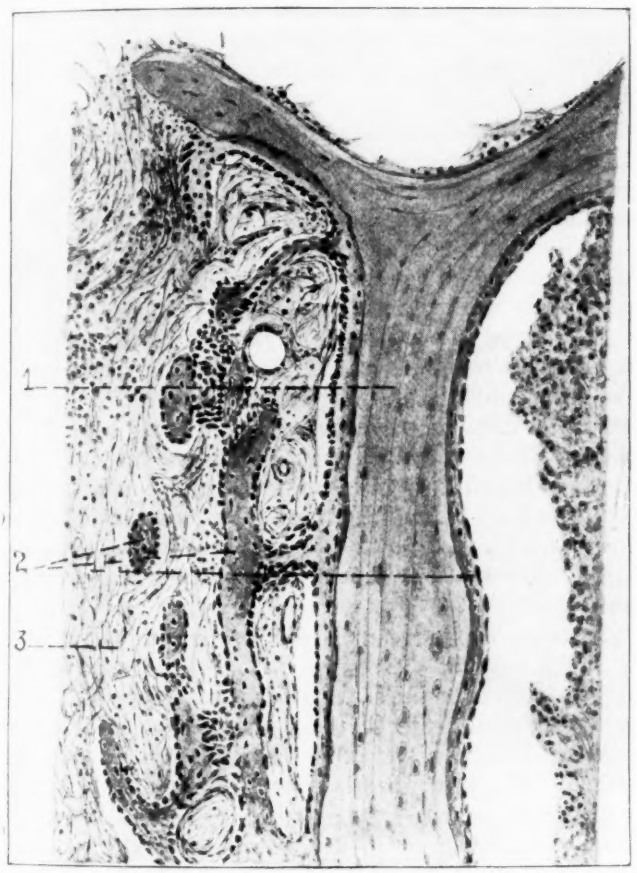

Figure 6.—Endosteal formation of bone arising from trabeculæ of marrow. 1. Original trabecula. 2. Newly-formed endosteal bone, partly adherent to original trabecula, partly appearing as new trabeculæ. 3. Alveolar spaces with granulation tissue arisen chiefly from reticulum of marrow.

indefinitely, or is discharged piecemeal, or must be removed by operation; and in either case, leaves a cavity which has usually no power of closing itself.

Periosteum.—As soon as the pus has been evacuated and the inflammatory process has subsided the periosteum proliferates and endeavors to maintain the vitality of the outer layer of cortical bone, or produces new bone to replace that destroyed by the inflammation. As already mentioned, in some cases to a considerable extent the periosteum, after the pus is evacuated, again comes in contact with and adheres to the cortical bone, and the cortical bone beneath such adhesions retains its vitality. This explains the adherence of the periosteum in places to an extensive sequestrum, which throughout most of its extent is completely separated from the periosteum.

In most cases, if the periosteum has been stripped to a great extent, this adhesion between periosteum and cortex does not take place. But the periosteum undergoes a process of proliferation analogous to that seen in the formation of the external callus in fractures. The cells of the periosteum next to the necrotic cortex are polygonal and are the bone-forming cells. Between adjacent cells a homogeneous intercellular substance appears, early "osteoid" tissue, and by fusion of such intercellular material the outlines of early osteoid trabeculæ are formed. Some of the polygonal cells are enclosed in the osteoid tissue, become branched and take on the

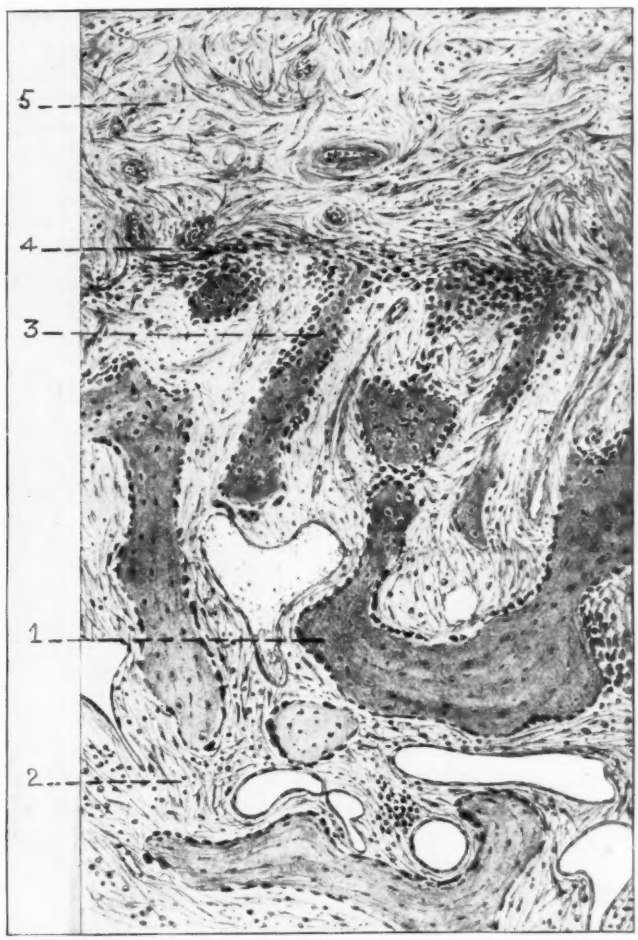

Figure 7.—Section through cortex and adherent new periosteal bone in osteomyelitis, duration about seven weeks. 1. Cortical bone trabeculæ. 2. Marrow spaces filled with granulation tissue. 3. Newly-formed periosteal bone trabeculæ. 4. Osteogenetic layer of periosteum. 5. Fibrous layer of periosteum.

function of bone corpuscles for the new trabeculæ of osteoid tissue. Other cells remain in contact with the outer surface of the new trabeculæ and take on the function of bone deposition on the outer surface of the trabeculæ, i. e., become "osteoblasts." In this way the deep layer of the periosteum becomes converted into a thin layer of delicate new periosteal bone, usually separated from the necrotic cortical bone sequestrum. The further development of bone in the periosteum takes place peripherally, the deep layer of the membrane forming bone, the intermediate layer producing polygonal, bone formative, periosteal cells, while the peripheral layer consists of layers of spindle cells, such as are seen in normal periosteum.

In the early stages the spaces between the newly-formed trabeculæ are filled with a rather myxomatous mass of cells, usually somewhat polygonal or stellate, with very delicate intercellular fibrillæ, usually very edematous. Among these cells lymphoid and plasma cells are very numerous, and occasional leucocytes are seen. Young blood vessels are numerous.

As the periosteum continues its peripheral growth with the formation of new periosteal bone, the old necrotic shaft finally becomes surrounded by a shell of newly formed periosteal bone, which, as a rule, is perforated at one or several points by sinuses for the discharge of pus from the necrotic shaft, i. e., an "involucrum" surrounding a "sequestrum" is formed. The sequestrum may lie entirely free, or, as already mentioned, may be adherent to the inner layer of periosteal bone to a greater or less extent. If there is a free space between sequestrum and involucrum the inner layer of the involucrum is lined by a layer of edematous granulation tissue from which a discharge of pus may continue indefinitely.

At first the periosteal bone is soft, partly osseous and partly osteoid, and very vascular, with myxomatous tissue in the alveolar spaces. The process of periosteal bone formation does not continue indefinitely, but continues only until sufficient new bone is formed to carry on the function of weight-bearing, i. e., at first the total diameter of new bone is greater than the diameter of the necrotic shaft was. This increase in diameter over that of the normal shaft is apparently due to the fact that the new bone is softer than normal bone, and consequently more of it is required to support a given weight than would be needed if the bone were normal. Later, as the new bone becomes denser and more like normal bone, there is a definite decrease in size of the periosteal shell, so that the total diameter of the shell may closely or exactly approximate the diameter of the original shaft.

In time the trabeculæ of the involucrum become completely ossified and osteoblasts become flattened out and approximated to the trabeculæ as an endosteum, just as in normal trabeculæ; the myxomatous granulation tissue becomes converted into fat marrow; and the entire involucrum assumes a structure like that of normal dense cortical bone or in some cases like the spongy bone of the epiphysis. Such dense bone has, just as cortical bone has, a very limited power of repair. Hence if at this late stage the sequestrum is removed, it leaves a cavity with walls composed of dense bone like cortical bone, which has very limited or no power of repair. This explains why cavities which are left after the removal of sequestra so often persist indefinitely and fail to close. This is especially the case if, at the same time the periosteal shell is forming, the marrow canal is closed by a plug of dense marrow bone, which arises by endosteal bone formation, or by a band of scar tissue which is converted by metaplasia into dense bone.

GROSS APPEARANCE.

Marrow.—The gross appearances of osteomyelitic bone vary with the histologic conditions already described. In the acute stage, marrow is first affected. If examined very early, no suppuration may be seen. The marrow simply is infected and necrotic. At that time it appears injected and gelatinous. At that stage, during an operation, it may be impossible on account of the hemorrhage to be certain that any gross change is present. Usually, however, cases are not seen until suppuration is well marked. Then on opening the marrow a profuse discharge of pus takes place. This pus may be yellow, or greenish, or red from hemorrhage, or brownish from disintegrated blood pigment. Usually the pus contains many large or small oil drops from disintegrated fat marrow. This oily pus is very characteristic. At this time if the bone can be removed and sawed through vertically, the marrow presents, not a diffuse suppuration, but a mottled appearance, partly red from injected or hemorrhagic marrow, partly red or yellow from unaltered marrow, and partly yellow or greenish from suppuration. The distribution of the different areas is very irregular, and probably is determined partly by the distribution of blood vessels and partly by the facility or difficulty of extension from one alveolar space to another.

At a still later stage the appearance of the marrow is still different. The yellow areas of suppuration persist, while other portions are red and injected, but the red color at this period is due to the formation of granulation tissue in many of the alveolar spaces. In some cases, one end of the shaft may present this mottled appearance, while the other end may appear normal, while between the two there may be a pink or red band of granulation tissue entirely closing the marrow canal and separating the infected from the normal area. If the destruction of the infected marrow has been complete and the cortical bone also has become entirely necrotic, the shaft may be converted into a more or less complete bony tube, filled with dirty granular detritus and pus, and, if the bone is spongy, the necrotic trabeculæ form a mesh or frame work of brownish sponge-like structure.

Cortex.—The appearance of the cortex also varies with the stage of the disease. If examined very early, the periosteum is thick and edematous, injected, and is easily stripped from the bone. The bone itself looks white and shining, and often shows minute red vascular points. At a somewhat later stage the periosteum may be entirely separated from the bone by a collection of pus, oftentimes over the greater portion of the shaft. The periosteum may appear as a very considerable fusiform, fluctuating swelling or sac, often of large diameter. On incising such a sac, the bone is seen smooth, white and often dull. In the stage when necrosis of the cortical bone is complete, the cortex appears dirty white, or brownish, or black, bare, and absolutely without luster. It may be broken into spicules of varying size, or may be perforated by sinuses, or may be worm eaten. The cortex in the early stages may be partly adherent to the periosteum, even when necrosis is marked. In the later stage the necrotic shaft may lie perfectly free in the periosteal shell or in some cases portions of it may be perfectly free, while other portions of it are united to the thick bony periosteal shell or involucrum by bony adhesions, and separation of the two may be difficult. Or, if the suppurative process has lasted for years, as often happens, only a few thin worm-eaten spicules of cortical bone are seen, lying in a cavity of

the periosteal shell which is covered with unhealthy granulations.

Periosteum.—The gross appearance of the periosteum in the early stages has been mentioned above in connection with the cortex, i. e., at first it is thickened and injected, and usually at an early stage is elevated from the bone by an extensive subperiosteal abscess. A few weeks later the periosteum is several times thicker than normal, and the deep layers are more or less rigid from the formation of bony trabeculæ, at first very delicate, pinkish white and crackling under the touch like hoar-frost. This crackling can also be detected by pushing a needle through the granulations at the edge of a sinus, when the new periosteal shell can be felt and heard to crackle under the touch of a needle. This can be used as a gross method to determine the proper time to operate (cf. infra). As time goes on, this periosteal layer increases in thickness, and finally forms a shell of variable thickness about the cortical sequestrum. The thickness of such a shell may be very great and equals, or sometimes exceeds, the total thickness of the original shaft.

This periosteal bone forms a cylindrical shell about the sequestrum and is always perforated at one or several points by sinuses for the discharge of pus. The shell, as already said, may be closely adherent to portions of the sequestrum, or may be separated entirely from the necrotic portion of the shaft, although it may be adherent by bony growth to the living shaft or to the epiphysis at the upper and lower ends of the sequestrum. If such unaltered portions of the shaft closely connected with the periosteal shell do exist, they usually are divided from the necrotic shaft by transverse bands of dense scar tissue, or more commonly in the old cases by a transverse layer or plug of very dense scar tissue or bone which frequently entirely occludes the marrow canal. In such a case the necrotic shaft lies in a cavity or box of dense ivory-like cortical bone. Such a cavity usually is lined with a layer of dirty unhealthy granulations. If the sequestrum is removed from such a cavity it leaves a cavity of dense bone lined with granulations, which has practically no tendency to heal. These cases are seen in old and long-continued "bone abscesses."

Soft Tissues.—Beside these changes in the bone, secondary changes in the soft tissues appear early. Even before perforation of the periosteum appears the adjacent muscles, subcutaneous tissues and skin show edema, redness and induration. If the periosteum is perforated an abscess, often very extensive, may appear in the soft tissues. Such an abscess may spontaneously perforate the skin at several points, forming permanent sinuses. The edges of such a sinus are lined with unhealthy granulations. Such sinuses may be very large. In long-continued cases the skin and subcutaneous tissue are thickened from formation of dense scar tissue, while edema and infection persist. In extreme cases an affected limb may for years be nearly twice normal size.

SYMPTOMS.

The disease usually begins with sudden local pain, usually quickly becoming severe, and generally of a throbbing character. This pain is usually referred to the shaft of some one of the long bones, commonly at one end near the epiphyseal line. The limb at this time often is not so sensitive on motion, but the pain is intense on percussing the bone, even very lightly, or on continued pressure. Usually at a very early period swelling of the soft parts about the bone appears, and this swelling soon shows pitting on pressure and marked redness. The adjacent joint frequently becomes tender, hot and swollen. This swelling at first more often is due to the edema of inflammation rather than to direct infection, for cultures of the joint fluid at this time often are sterile. Rise of temperature to 103 or 104 often accompanies the early pain, and frequently the pulse is greatly accelerated, 120 to 140 beats per minute. Evidence of constitutional disturbance and infectious absorption usually appears early. The tongue is dry, coated and tremulous, the face drawn and flushed. Delirium, often of a mild type, is a very common factor, and this delirium frequently persists for some weeks after drainage of the bone has been made. Abscess of the soft parts may give deep or superficial fluctuation. Sinuses may appear. The leucocyte count usually is very high.

Such a chain of symptoms would appear to present a fairly distinct clinical picture, and it would be difficult to overlook such a typical case. The diagnosis of early cases, however, quite contrary to some statements, may be very difficult. Even in severe cases, the pain for some days is not severe. Sometimes the patients complain of very moderate pain for several days before local symptoms are evident, and the pain at first frequently is referred to an adjacent joint in which no gross change can be made out. Sometimes swelling of an adjacent joint comes on so early as to call entire attention to the joint, and distract one's observation from the bone focus until later swelling and edema of soft parts, or abscess over the bone, give evidence of extreme bony destruction. These cases frequently for days are treated as articular rheumatism.

The infection may be so severe and the patient's mental condition so stupid that the pain is not noticed, so that the cases may be mistaken for typhoid fever; this, too, by very competent and well-trained men.

These difficulties, however, do not excuse many of the frequent failures to recognize the condition, which seem often to be due to a neglect to remember that osteomyelitis is a not uncommon disease in children and young adults.

DIAGNOSIS.

The diseases most frequently mistaken for osteomyelitis are early acute tuberculosis of joints, acute articular rheumatism, gonorrheal rheumatism and typhoid fever.

Tuberculosis of the joints practically always begins in the epiphysis of the long bones, while osteomyelitis almost always begins in the diaphysis. This distinction will clear up the diagnosis in many cases. It is said that occasionally osteomyelitis begins in the diaphysis, although I never have seen such a case. In such a case the very acute onset, the early extreme pain and the early appearance of constitutional symptoms should permit of a diagnosis. Moreover, in epiphyseal osteomyelitis, spontaneous separation of the epiphysis is said to be common.

Acute articular rheumatism, as a rule, affects more than one joint, although one joint may be especially involved. In osteomyelitis the great severity of the affection of one joint, with the usual early marked redness and edema of the soft parts, and the almost constant bone tenderness, usually allow early differentiation.

Gonorrheal rheumatism, of course, may affect one joint, and the early symptoms may be severe. The bony tenderness is wanting, and the history or presence of an antecedent gonorrhea can usually be determined. It may be possible to cultivate gonococci from the joint fluid. A monarticular "rheumatic" attack in children or young adults should always cause at least a consideration of acute osteomyelitis.

The pain and local symptoms, the high leucocyte count, as well as the very sudden onset and absence of the Widal reaction, usually allow a distinction between typhoid and acute osteomyelitis to be made.

Any extreme pain in bone, with or without swelling, should always lead to a consideration of acute osteomyelitis. Both swelling and abscess formation may be delayed for several days. In the chronic cases a persistent sinus connected with bone means necrosis of bone, and suggests osteomyelitis, tuberculosis, actinomycosis, or rarely epidermoid cancer.

CLASSIFICATION OF TREATMENT.

Based on pathologic conditions, the course of osteomyelitis may be divided into three different stages: The acute stage, i. e., the stage of infection, necrosis, suppuration and general intoxication; the subacute stage, which begins with the evacuation of the purulent exudate and the cessation of toxic absorption; and the chronic stage, marked by the formation of sequestrum, involucrum and sinuses. The indications for treatment for these three stages are quite different, and will be discussed separately.

TREATMENT OF THE ACUTE STAGE.

In the acute stage there is inflammation of marrow, and often a subperiosteal abscess, and abscess of the soft parts. The indications are the same as in any other acute suppuration, i. e., evacuation of the pus. This demands evacuation not only of the soft parts, but of the bone as well. Incision of the soft parts alone is not sufficient. For evacuation of bone, a good-sized trephine button, at least one-half inch in diameter, of cortical bone should be removed, and if pus escapes from the marrow the hole should be enlarged along the shaft with rongeur forceps and chisel as long as pus can be found in the marrow. In early cases, a layer of cortical bone one-half inch or more wide and two or three inches long may suffice. In advanced cases a lid of bone should be removed from the entire length of the shaft. One very important fact should be borne in mind. The integrity of the endosteum is essential for the vitality of the inner layer of the cortex. Hence do not curette out the marrow. Extensive and vigorous curettage of the marrow, as frequently is done, is sure to destroy whatever of the endosteum is left, and necrosis of at least the inner layers of cortical bone is sure to follow. Moreover, such destruction is not necessary. The communication of alveolar spaces is perfectly free, as can be seen by injecting dried bones; removal of a sufficient amount of cortical bone gives good drainage to the marrow, and the undestroyed endosteum may be sufficient to repair the defect, and, in rare cases, allows the injured bone to heal without sequestrum formation. (See Case I infra.)

If the disease has extended to the epiphysis, removal of the cortex of the epiphysis will drain the epiphysis. In some cases extension to and suppuration of the joint cavity may occur so early as to require opening and drainage of the joint at the primary operation, although usually the early swelling of the joint is due to secondary edema. In operating on the cases where the epiphysis is involved, it is desirable to interfere with the epiphyseal line as little as possible.

TREATMENT OF THE SUBACUTE STAGE.

After the acute process has subsided from spontaneous or artificial evacuation of the pus, there comes the subacute stage, with necrotic shaft and proliferation of the periosteum. The amount and location of necrotic bone may vary. At times only a longitudinal sliver of a portion or the entire thickness of the cortex may be necrotic. In such a case, removal of the sliver may expose a layer of granulation tissue, arising from the marrow. Such granulation tissue arises from the proliferating reticulum of the marrow and from the endosteum. Such tissue may grow up to the level of the removed cortical sliver, periosteum may grow in from the sides, and ultimately the bony defect may in this way be replaced and complete healing may occur. Such favorable cases are rare.

More often there is a necrosis of the entire circumference of the shaft throughout its entire length or a considerable portion of its length. Such an extensive necrosis must be entirely removed, or a permanent sequestrum enclosed by a shell of involucrum will persist indefinitely. The old surgical axiom was not to remove such sequestra until they were freely movable, which meant practically no removal until the formation of involucra in most cases.

THE CHIEF OBJECT OF THE PRESENT ARTICLE.

The chief object of this paper is to emphasize and illustrate the fact that by early removal of such sequestra at a secondary operation, and by approximation of the inner surface of the proliferating, partly ossified periosteum, a new shaft of periosteal bone will be produced with constant regularity, which forms a new bony shaft, joins the epiphyses, or whatever portion of sound shaft is left, occupies the position of the original shaft, heals without sequestra or sinuses, and practically produces a new shaft of approximately the same size as the original shaft, which by physical examination can not be distinguished from the original bone. In consideration of the painful disability which follows the older method of treatment, lasting sometimes for many years, the results of such an operation are remarkable, while the functional results are perfect.

DISCUSSION OF METHODS FOR THE REPAIR OF BONY DEFECTS.

To close defects left by the late removal of sequestra at a late period, always a difficult matter, many methods have been tried.

The chief methods which have been recommended for the closure of large bony defects have been Hamilton's sponge grafts, Schede's aseptic blood clot, Neuber's approximated skin flaps and Senn's decalcified bone plates. Hamilton[11] recommended that the bone defects be filled with sponge, and claimed that the sponge acted as a framework for the formation of new bone, and that ultimately the sponge was absorbed. In that paper he described the use of the sponge in one case of extensive bone defect, but the result was a failure. In the conclusions, however, he recommends the sponge, with some apparent hesitation, entirely on theoretical grounds. The histologic descriptions of the conditions found in attempted sponge grafting in lesions of the soft tissue are not at all conclusive of the correctness of the theory. Schede[12] recommended that stiff walled bone cavities be filled with aseptic blood clot, in order that organization of the clot might ultimately fill the bone defect with dense fibrous tissue. He closed the skin over the cavity except at the apex and covered the cleft so formed with protective, in order to provide for complete filling of the cavity and to prevent drying of the clot. Outside of the protective came a heavy absorbent dressing to take up excess of blood. He claimed that failures were due to failure to disinfect the cavity completely, to failure to entirely fill the cavity with clot, to neglect to remove all sequestra, or to local recurrence of tuberculosis at the edges of the wound. Considering the great difficulty of obtaining complete asepsis in such a cavity as that present in advanced osteomyelitis, Schede's results were surprisingly good. I have had an opportunity to try Schede's method in but three cases. The results were total failures, because in each instance the clot became infected, ultimately broke down, and was disintegrated. Neuber got unsatisfactory results with this method.

Neuber[13] found difficulty in disinfecting the bone cavity and sinuses sufficiently to obtain aseptic healing of the blood clot, especially where the bony defect was a large one. He tried to obviate this difficulty by cleaning out the bone cavity, removing the "osteophytes" (apparently the involucrum) and turning in flaps of skin and soft tissue adjacent to the bony defect in such a way as to line the trough with skin. These flaps were held in place by nails, plaster, or by "invagination" stitches specially applied. After healing there is at first a trough lined with skin, but Neuber says that finally the soft tissue retracts and the dimple largely or entirely disappears.

Both of these methods depend on the formation of a scar derived from soft tissue, but do not take into account the reparative power of the bone periosteum, and in a measure must be considered to avoid the conditions rather than to cure them. Both methods undoubtedly have under certain conditions given good results. Schede's blood clot seems more likely to succeed with small cavities, while Neuber's offers the best chance of successfully closing large ones.

Senn[14] recommended decalcified bone chips which had been rendered aseptic by soaking in an alcoholic solution of corrosive sublimate and by being dusted with iodoform before use. The success of the operation depended on complete sterilization of the cavity before the chips were packed in. Then coagulated blood was supposed to seal the chips together. Senn claimed by this operation to avoid the marked loss of blood which occurred in Schede's method, and also the great and unnecessary destruction of sound bone produced by Neuber's method. Essentially Senn's method is analogous to Schede's, except that he has a dense animal tissue to organize instead of an extensive blood clot. It is difficult to see what advantage the chips can have over the blood clot under these circumstances, and the operation, according to Senn's own account, is as much dependent on obtaining perfect asepsis as Schede's method. The difficulty or impossibility of obtaining such ideal asepsis in chronic osteomyelitis has been mentioned.

THE WORK OF OLLIER ON BONE REGENERATION.

The most scientific and valuable work was done by Ollier.[15] In this monumental work Ollier demonstrated by excellent experimental work the regenerative power of the periosteum and its ability to regenerate an entire bone. He also applied this regenerative power to resection and ablation of bone, both for tubercular and osteomyelitic bone lesions. He seems, however, to have been hampered by the fact that he was able to make no sharp distinction between tubercular and infectious lesions; by a failure to appreciate the reparative power of the endosteum, and by the fact that antiseptic surgery had not been developed. Hence, although his operations were done on scientific principles, he was unable to obtain results equal to those obtained with modern technic. Consequently his operations were performed only under special conditions to "check excessive suppuration and avoid pyemia," and were not deliberately undertaken as the natural sequence in the course of a well-understood series of pathologic changes. His work is, however, a remarkable example of accurate observation, close reasoning and logical deduction.

The earliest mention of operations undertaken on the principles laid down by Ollier in this country that are known to me will be found in the Medical and Surgical Reports of the Boston City Hospital.[16] The cases, however, were undertaken because of special indications in the individual cases, chiefly profuse suppuration and extreme necrosis, and the general principles underlying the operation seem not to have been recognized, nor was any attempt made to formulate any general operative procedure.

THE AUTHOR'S THEORY.

My own attention was called to conditions which exist in osteomyelitic bones while working on the pathology of bone lesions in the Sears Laboratory of the Harvard

11. Hamilton, D. J.: On Sponge Grafting, Edin. Med. Jour., vol. xxvii, p. 385, 1881.

12. Schede, M.: Ueber die Heilung unter dem feuchten Blutschorf, Dtsch. Med. Wochenschr., vol. xii, p. 389, 1886; also, Ueber die Heilung von Wunden unter dem feuchten Blutschorf., Vorhandl. der Dtsch. Gesellsch. f. Chirurgie, April, 1886, p. 62, Berlin.

13. Neuber: Zur Behandlung starrwandigen Hohlenwunden, Arch. f. klin. Chir., April, 1886, p. 62; also, Veränderungen decalc. Knochenrohren in Weichtheilswunden, Arch f. Klin. Chir., vol. xxv, Heft 4, p. 316, 1879.

14. Senn: Healing of Aseptic Bone Cavities, Am. Jour. of Med. Sci., New Series, xcviii, p. 219, 1899.

15. Ollier: Regénération des Os, Paris, Victor Masson et Fils, 1867.

16. Cheever, D. W.: Reproduction of the Tibia, Med. and Surg. Reports, Boston City Hosp., First Series, 1870, p. 362.

Medical School in 1895. From a study of a considerable number of cases of osteomyelitis it seemed likely that it might be possible to remove the necrotic shaft at an early period and to approximate the inner surface of the ossifying periosteum, with the hope that by adhesion of these approximated internal surfaces the peripheral growth of the periosteum would reproduce a shaft which would take on the function of the removed necrotic shaft. It seemed probable from anatomic and pathologic reasons that the time for removal is not during the very acute stage. At that time the periosteum is thin and contractile, and it seemed likely that difficulties in manipulating the periosteum and perhaps inability to obtain careful or accurate approximation of the inner surfaces, as well as the difficulty of maintaining the alignment of a merely fibrous band, would make the mechanical manipulation impossible. Moreover, because of the intense infection present during the acute stage, it seemed that there would perhaps be more or less infection and destruction of the periosteum which would prevent adhesion, and might also interfere with the bone-forming function of the membrane. It seemed likely that a better time might be the one when acute suppuration and infection had ceased, and when the periosteal proliferation and ossification had advanced to such a stage as to make certain the bone-forming ability of the membrane, and to make it sufficiently rigid to allow of accurate manipulation, without, however, the ossification being so advanced as to produce a rigid, non-plastic bony tube. This idea was first publicly stated in a paper read before the Massachusetts Medical Society, June 7, 1898, although it had previously been taught in the class room for three years. The period when these conditions would exist was reckoned by examination of a number of pathologic specimens to be about the eighth to the tenth week, and this time was later confirmed by examination of tissue from cases convalescent from acute attacks. The credit for the first operation based on this theory is due to Dr. Hayward W. Cushing[17] of Boston. The case was a complete success, and since then the operation has been performed at the Boston City Hospital on a number of cases, by various surgeons, with uniformly good results.

The early operations were done on diseased tibiæ. In such cases the fibula acts as a splint, maintains the length and, to some extent, the contour of the leg. It was found later that the problem was a different one in disease, e. g., of the humerus. In such a case there is no accessory bone to act as a splint, and the danger was that if the dead shaft were removed before the periosteum was sufficiently rigid to bear weight or maintain contour, that muscular contraction and the impossibility of maintaining immobility might lead to great deformity of the limb. But it was believed that the earliest stages of the vascular and partly ossified involucrum might in contrast with the late, dense walled involucrum, have a power of growth centrally as well as peripherally, and two very successful cases have shown the correctness of that idea. So that the operation in the subacute stage can be divided into two classes, (1) those cases where an accessory bone is present to act as a splint, and (2) those cases where but one bone is present.

17. Cushing: Annals of Surgery, October, 1899.

OPERATION WITH ACCESSORY SPLINT BONE.

The operation is indicated in those cases where there has been an extensive destruction of the entire diameter of a diaphysis over a greater or less length. If such a necrotic shaft is not removed it will persist as a sequestrum indefinitely, periosteal involucrum will form, and if the sequestrum is removed late, a box of dense bone will be left lined with granulation tissue, which usually will not close spontaneously.

The time for operation is the stage when periosteum has begun well-marked ossification in its deeper layers, and yet ossification is not so far advanced as to form a rigid periosteal shell. This time varies somewhat in different cases, but careful observation of a number of the cases shows that the average time for this condition to occur is about the eighth week after the acute infection has been stopped by spontaneous, or, better, by operative evacuation of the pus. The presence of well-marked ossification can be accurately determined by removal and examination of small bits of the periosteum from the edge of a sinus, being sure that periosteum is removed, and not merely a layer of granulation tissue derived from the soft parts. By microscopic examination the amount of formation of periosteal trabeculæ can be determined. The layer of bone formation should be about one-sixteenth of an inch in thickness. In a rough way the presence of this bony layer can be determined by thrusting a needle through the periosteum at the edge of a sinus. If new periosteal bone has been formed, the needle passes through soft tissue, then through a crackling, thin layer of delicate bone, and brings up against the dense shell of the necrotic shaft. When this thin, crackling, periosteal layer is felt, the periosteum is at the best stage for performance of the operation. At this stage an *x*-ray photograph may show some hazy thickening outside of the necrotic original cortex, but, as a rule, *x*-ray examination is much less satisfactory than the other two methods mentioned.

The extent of the operation, too, depends on the portion of the shaft which has been destroyed. In severe cases practically the entire diaphysis is destroyed. In such a case, removal of the entire diaphysis between both epiphyseal lines may be indicated. In other cases, especially where artificial drainage has been completed early, only a third or half of the shaft may be necrotic, while the rest of the shaft is viable and does not need to be removed. The amount to be removed can be determined by the condition of the periosteum, the amount of granulation tissue and pus between the periosteum and the old cortex, and by the condition of the marrow.

It may be taken as a working rule that such portions of the shaft as show no endosteal thickening or ossification, nor separation of periosteum, probably are viable. If at a given level the marrow shows no suppuration, but only moderate injection, it probably is safe to leave such portion of the shaft, and the limits of necessary resection are reached.

THE TECHNIC OF THIS METHOD.

The most favorable time for removal being decided on, an incision should be made through the soft parts and

periosteum down to the necrotic bone, placing the incision along that part of the bone nearest the surface, and, when possible, including in the incision the sinus or sinuses persisting from the primary operation. By retracting the edges of the incision one can with a curved, flat, square-ended, periosteum elevator strip the periosteum from the necrotic shaft. Over the necrotic shaft the periosteum in places may be quite or entirely free. At times, however, the periosteum, usually over small areas, is quite closely adherent. Care should be taken not to puncture the periosteum at

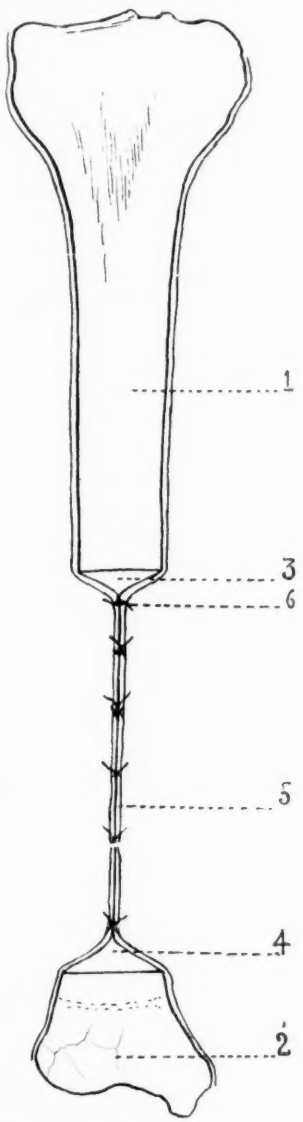

Figure 8.—Diagram to show relation of infolded periosteum in a case of complete removal of a portion of the tibia. 1. Upper portion of diaphysis of tibia cut squarely across. 2. Lower epiphysis and small portion of diaphysis. 3. Dead space between lower end of upper diaphysis and infolded periosteum. 4. Dead space. 5. Infolded and approximated periosteum. 6. Sutures.

such points so that the periosteal tube to be formed may not be imperfect. As a rule, in front and laterally, removal of the periosteum is easily accomplished, but behind, e. g., along the posterior ridge of the tibia, removal may be difficult and require much care. If the shaft is movable at the affected epiphyseal line, one end of the shaft can be lifted by lion-jawed forceps, and the periosteum can be stripped downward from that point. Or sometimes the bone can be freed at the middle of the shaft, sawn across, and the stripping continued from that point toward each epiphysis.

In case the whole length of the shaft is not involved, one end usually can be easily detached from the epiphyseal line and the bone can be sawn, or cut through with a chisel, at that point of the shaft which is judged to be sound. If the bone is sawn through at a point where marrow seems infected, the shaft can be cut down still further by chisel or bone forceps until normal marrow is reached. In some cases, the marrow canal, as already stated, may be partly or wholly occluded by newly-formed scar tissue or dense endosteal bone. In such a case the shaft should be removed until the marrow is vascular and not infected, otherwise there is danger that the new shaft which will arise from the periosteum will not joint the dense old shaft and a pseudarthrosis might result. This precaution I believe to be very important.

After the removal of the shaft, entire or partial, the inner surface of the periosteum presents, extending from epiphysis to epiphysis or from epiphysis to normal shaft, as a wide band, usually pinkish white, with its surface studded with a thin white layer of bone. The membrane is plastic, not retractile, and crackles when folded. Sometimes small areas are lined with vascular granulations, and sometimes there is some purulent infiltration over areas which have been widely separated from the necrotic bone. It is desirable to disinfect the infiltrated areas as much as possible before folding the inner surface of the periosteum together. I have found 95 per cent. carbolic acid for two or three minutes, followed by swabbing out and washing with alcohol, useful.

After the removal of the shaft and disinfection of the tissues, the periosteum should be folded together in such a way as to make a flattened ribbon or tube of periosteum, approximating inner surface to inner surface, and leaving external surface still external. In this way the folded surfaces can adhere to each other, while peripheral periosteal growth can take place to form the new shaft. The edges of the ribbon should be fastened together by some sort of absorbable suture, preferably fine chromic catgut. Plain catgut does not, as a rule, persist long enough. The edges of sinuses in soft tissues should be curetted and trimmed and then the skin, and perhaps muscle, incision should also be closed by animal sutures. Sterile gauze and a plaster bandage complete the dressing.

It is to be remembered in approximating the periosteum that it is attached at either end of the ribbon to epiphysis or shaft. The epiphysis, of course, is, as a rule, wider than the shaft. Hence on infolding the periosteum there always will be a more or less extensive triangular dead space, just below the epiphysis, where the internal surfaces of the periosteum can not be completely approximated. Such an area finally will be filled with bone arising by central growth of bone from periosteum and epiphysis, but this growth is completed later than the regeneration of the shaft, remains yielding quite late and frequently shows some evidence of necrosis long after the rest of the regeneration is completed. A very minor operation on such an area, i. e., dilatation of a sinus and curetting, may be necessary before such an area will completely heal.

If a portion of the shaft is left at the time of the resection and the sound end is cut off square at right angles to the shaft, the same triangular dead space may persist, but in such a case if the end of the old shaft is tapered off by chisel and forceps, the bone may be so pointed as to allow complete approximation of the periosteum. Such an expedient can not, however, be safely adopted with the epiphysis and yet allow the preservation of the epiphyseal line.

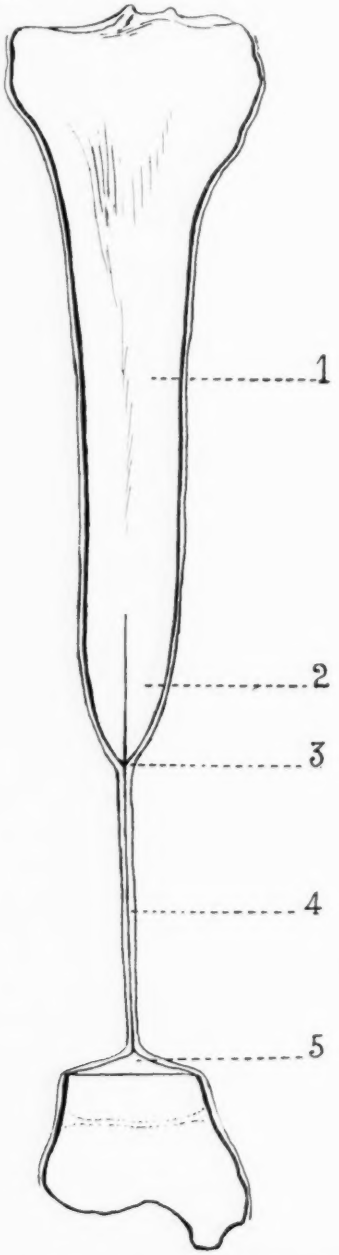

Figure 9.—Diagram to illustrate method of avoiding dead space in case of partial removal of e. g., shaft of tibia. 1. Upper portion of shaft of tibia. 2. Lower end of shaft chiseled into conical shape. 3. Close approximation of periosteum to conical end of shaft, obliterating upper dead space (See Fig. 8, No. 3). 4. Approximated periosteum, after removal of portion of shaft. 5. Dead space just about epiphysis, as epiphysis can not be made conical without interfering with epiphyseal line.

AFTER-TREATMENT.

Certain precautions and difficulties in the operation and after-treatment should be considered. Of course, some infection and suppuration will be present when the operation is done, but they should be minimized as far as possible. For this purpose free incisions, followed by careful daily dressing and irrigation, should be provided for some time before removal of the shaft when necessary. Often the reaction to the inflammatory process in the soft tissues and periosteum leads to the formation of an enormous amount of vascular granulation tissue in the soft parts about the bone. Incision of such parts may lead to a very great oozing hemorrhage during the operation, sufficient at times to make the operation dangerous from loss of blood. This may be avoided by the application of an Esmarch bandage before the operation and removal after the dressing. I have known of two cases where the hemorrhage was so severe as to require that the operation be done in two steps; at the first step periosteum was partly peeled back from the bone and the operation completed some days later after hemorrhage had ceased.

In regard to closing the wound, it is to be remembered that the operation practically never can be done on perfectly aseptic tissues. Some suppuration may take place between the approximated surfaces of periosteum, and some is sure to take place between the soft tissue edges. Consequently it is advisable to leave the stitches in the periosteum as far apart as is possible with accurate approximation of the edges. The edges of the soft tissue may be closely approximated, but provision for drainage should be made by very small gauze wicks or catgut drains.

The operation produces usually moderate depression, not so severe as an amputation. In spite of all precautions there is apt to be some evidence of septic absorption, coming usually on the second or third day, but usually disappearing within a week. In two cases the post-operative infection was sufficient to cause mild delirium for a week.

The wound may heal by first intention over the greater portion, but some redness and slight sloughing of the edges usually appear. In one case this sloughing was sufficient to cause considerable gaping both of soft tissue and periosteum. Sinuses often develop for a time, but have always ultimately disappeared. They usually appear near the epiphysis, or at the junction of periosteum and shaft. As has been said, sometimes a slight amount of curetting may be necessary before permanent closure takes place. It is desirable to prevent backing up of infection because of the danger of infection of the epiphysis and ultimate infection of the joint as happened in one case (Case 5, cf. infra).

The first dressing should be done usually by the third day; a wet dressing may be necessary for the first ten days. After that time, dressing should be done sufficiently often to absorb any discharge.

Marked induration along the line of the bone usually is felt by the third week. From that time on the bone gradually increases in density and size. The new shaft at first and for some months has no marrow canal, but is composed entirely of trabeculæ of periosteal bone with myxomatous granulation tissue, instead of fat marrow. The new shaft grows to be larger than the original shaft during the early months, but in time decreases in size and practically comes to the size of the corresponding shaft. In course of time a marrow canal appears in the new bone, to judge from the *x*-ray pictures. I never have had a chance to examine such bones at autopsy.

As a rule, the new shaft is a trifle more irregular than the original shaft. The shaft is strong enough to allow free use after from five to eight months. Even when the entire diaphysis has been removed, if the epiphyseal line has not been interfered with, no shortening of the limb need result, and that, too, in young adults of fourteen years. As far as function and use go, the results often are absolutely perfect. Even in cases where the epiphysis is interfered with, the shortening may be slight and the function perfect.

OPERATIONS WHEN NO ACCESSORY SPLINT BONE IS PRESENT.

The above operation is particularly applicable to bones like the tibia and fibula, or the bones of the forearm. In cases where there is only one bone in a limb, e. g., the humerus, the danger of deformity from muscular contracture must be considerable if the necrotic shaft is removed before the periosteum is rigid. But, as has already been said, if the periosteal shell is allowed to become too rigid and dense, it has very little or no power of repair centrally. The triangular space, however, between epiphyseal line and approximated periosteum showed, in some of the operations on the tibia, some power of growth centrally, so it was believed that the periosteal shell, if the necrotic shaft were removed from the box of involucrum early enough, might have sufficient power of central growth to repair an extensive central defect. Naturally the time when such a power would be greatest would be when the shell was as young as possible, i. e., just as soon as the shell was sufficiently hard to bear weight or maintain the contour of the limb. This assumption has been found to be true. The difficulty of telling just when this time has arrived is considerable. The *x*-ray furnishes the best means of determination, and the relative apparent increase in the size of the shaft due to formation of involucrum tested by palpation also is of assistance. With sufficient fixation, new periosteal bone whose diameter is equal to one-half the diameter of normal shaft is sufficient.

POINTS IN THE TECHNIC.

Hence in such cases the secondary operation must be undertaken at a somewhat later time than the secondary operation in cases where an accessory splint bone is present. In the two cases where there has been opportunity to try the operation, the time was judged to be sixteen weeks. The operation requires an incision through soft parts down to periosteal shell. Then with chisel and gouge a longitudinal opening must be made through the periosteal shell long enough to reach the lower end of the necrotic shaft, unless, from the early drainage operation, a gap has been left in the periosteum. If sufficient opening through the periosteum is made at the primary operation, but little will need to be done at the secondary operation. The opening must be approximately one-half an inch or more wide. Then the necrotic shaft must be grasped by bone forceps and by a rocking motion, without too much lateral force, be freed from the periosteal shell. Then it can be crushed by pressure of forceps, and withdrawn piecemeal through the opening. Separation of the fragment at the epiphyseal end, as a rule, should be easy. If the shaft is firmly adherent to the end of the original shaft, very careful chiseling may be necessary to free it. The cavity in the periosteal shell can be cleaned out with 95 per cent. carbolic, followed by alcohol. The skin incision should be closed by chromic gut sutures, except for a small opening for a small gauze drain. Fixation must be continued for some time until the bone has become sufficiently rigid not to be broken by muscular action or slight blows. Complete closure of such a cavity demands a longer time than usually is taken for regeneration of a tibia, apparently because power of growth of the vascular involucrum centrally is less than its power of peripheral growth.

This operation is essentially the removal of a sequestrum from an involucrum, but it is the removal of an adherent sequestrum at an early stage, from a young involucrum which can grow centrally, and not the removal of a movable sequestrum from an involucrum of dense bone which has no such power. The latter and older method leaves a bony box which does not repair the defect.

TREATMENT OF THE CHRONIC STAGE.

In this stage there exists usually an old necrotic shaft, usually worm-eaten, perforated by sinuses, and often freely movable, enclosed by a shell of dense, periosteal bone like the cortex of normal bone. Moreover, the ends of the sequestrum often are separated from the epiphyseal line and from the sound portion of the diaphysis by a layer of very dense bone which has arisen from the endosteum, and has completely occluded the marrow canal. This endosteal plug also is composed of dense bone like cortical bone; that is, the sequestrum lies in a complete box of endosteal and periosteal bone which has no power of central growth. Removal of the sequestrum may give drainage, but the defect fails to heal. Such a cavity usually is lined with dirty granulation tissue from which a constant discharge takes place. If the granulations are removed, the wall is seen to be dense white bone. Such a cavity may persist for many years; in one case seen by the writer it persisted for forty years.

Ollier showed by experiment on animals that normal periosteum was capable of regenerating an excised shaft of normal bone. Case 2, mentioned below, shows that, in the human subject, the periosteum at times is capable of regenerating a shaft removed during the acute stage of osteomyelitis. It seems possible that advantage of this regenerative power of the periosteum might be taken in cases of chronic osteomyelitis with a box of dense periosteal and endosteal bone. In chronic cases outside of the periosteal involucrum is a layer of approximately normal, although usually somewhat thickened, periosteum, which can be stripped from the outer surface of the involucrum. If the sequestrum and involucrum together are then removed, the inner surface of the periosteum then can be folded and approximated as in the operation during the subacute stage, with an excellent prospect of regeneration. It is to be borne in mind that, in these cases, when the entire shaft is not involved the medullary canal for some distance above and below the sequestrum undoubtedly is occluded by dense endosteal bone, of limited power of growth. Consequently it will be essential to chisel through this sclerotic bone until fairly normal vascular bone marrow is reached,

otherwise there is danger either of great delay in union, or of failure of the regenerated periosteum to join the sclerotic ends of the shaft. In the only case in which I have had an opportunity to try this operation, in a somewhat modified form (see Case 12), the regeneration of bone was sufficiently complete to give a useful leg, although, probably for special reasons, a small sinus still persists. I believe that the prospects of complete cures in such cases are good enough to justify other attempts at the operation.

ILLUSTRATIVE CASES.

The following clinical cases are presented to illustrate the feasibility of the operation, the constant periosteal regeneration and the excellent results which can be obtained. Where the cases were not my own, the name of the surgeon who operated has been given. My thanks are due to my colleagues on the staff of the Boston City Hospital for permission to present such cases:

Figure 10.

Figure 11.

Figure 10.— Case 1. Shows attitude, without atrophy or shortening. Scar of operation, inner side left thigh. Eight months after operation.

Figure 11.—Case 1. X-ray, left femur, side view. Slight change of density of bone, probably at upper limit of trephine hole in cortical bone. Eight months after operation.

CASE 1.—W. J. D., boy, 4 years old. Case of Dr. J. C. Munro. Admitted to the hospital Aug. 5, 1902. Seventeen days before entrance fell while playing and bruised thigh. No known focus of infection. No symptoms for eleven days. Then sudden pain, soon followed by swelling of left thigh just above the knee joint. Pain and swelling increased, and some effusion appeared in the knee joint, which was flexed to within ten degrees of a right angle. Temperature 100.5, pulse 120.

Operation.—An incision three inches long was made on the anterior surface of the femur through skin and quadriceps muscle, with the lower end just above the upper limit of the capsule of the knee joint. The periosteum bulged, and when incised two or three ounces of thin yellowish pus escaped. The periosteum was stripped from the femur for a vertical distance of three inches, and apparently over the entire circumference. Shaft of femur was white and bare. Opening made through femoral cortex into medullary cavity gave vent to about one ounce of thin, oily pus. The opening was continued downward to the upper epiphyseal line of the femur, and extended upward to make an opening three-quarters of an inch wide and three inches long. The medulla was not curetted or disturbed. Wound irrigated and closed about one-half by stitches at upper and lower ends. Wet dressing. Ham splint.

Results.—Immediate improvement in general condition. Local swelling rapidly subsided, and effusion into joint disappeared. Wound healed fairly quickly by granulation. The patient was discharged seventeen days after operation with a superficial granulating sinus, wearing a ham splint. The sinus was completely healed within three weeks after discharge and has continued so ever since. Culture taken at time of operation showed *Staphylococcus pyogenes aureus* in pure culture.

Figure 12.—Case 2. Left leg, *x*-ray, front view. Nine months after operation. Tibia regenerated except in lower fourth. Irregular outline of tibia probably due to difficulty of manipulating periosteum in acute stage. Eight months after operation.

Examined April 2, 1903. Well-developed child, walks and runs without any limp. Over anterior surface of thigh a rather broad linear scar, not adherent to bone underneath. No shortening or atrophy of left leg or thigh. No tenderness. On palpation no thickening of femur can be made out. Motions at knee joint normal. Child has had no symptoms for months.

This case shows that in cases seen sufficiently early, before destruction of the marrow is too advanced, removal of cortical bone alone, without disturbing the endosteum, will give sufficient drainage to the bone, and,

Figure 13.—Case 2. Left leg, *x*-ray, side view. Eleven months after operation. Tibia regenerated except small portion of lower fourth. Antero-posterior bowing marked, probably because of difficulty of manipulating periosteum in acute stage.

in some cases, will allow complete restitution of the bone without formation of a sequestrum. It also shows that the effusion seen early in many of these cases is not due to infection of the knee joint, but is a manifestation of inflammation only.

CASE 2.—A. S., boy, 4 years old. Case of Dr. F. B. Lund. Admitted June 15, 1899. Three days previous to entrance fell and bruised his left leg, without breaking the skin. The next day the leg was swollen, tender and painful, and the patient had a chill. There was no known focus of infection.

At entrance the left leg was swollen from knee to ankle, extremely painful, tender and edematous. Temperature 103.

Operation.—June 16, an incision was made along the crest of the tibia from the tibial tubercle to just above the ankle joint. Hemorrhage was profuse. The periosteum bulged into the wound, and when incised gave vent to several ounces of thin yellow pus, and showed that the periosteum was almost entirely stripped from the tibia. The shaft of the tibia was white and bare. The shaft was excised between the tibial tubercle above and the epiphyseal line below. The wound was partly closed by sutures, and a wet dressing and a posterior wire splint applied. There was immediate improvement in the general condition.

Results.—During the first few days there was considerable discharge of pus, with some sloughing of the edges of the wound. The wound in a few days became a clean granulating trough, which closed from the bottom. The leg showed some tendency to outward bowing. On July 15, twenty-nine days after the operation, there was a fairly firm tibia from the tibial tubercle half way down the leg, and the wound was entirely healed with no sinuses. Two weeks later, forty-three days after operation, the upper three-quarters of the tibia was solid, while the lower quarter was elastic. August 13, two months after operation, the bone was solid except at the upper and lower ends. There was a small sinus at the lower end of the incision, at the junction with the epiphysis, and this sinus was dilated and two small fragments of necrotic bone were curetted out. On October 16 the patient was discharged wearing a plaster bandage. He had been about in plaster with crutches for some time. There was no sinus, and the new shaft was solid except at the junction with the lower epiphysis, where there was a slight elasticity. Every endeavor has since been made to find this patient, but without success.

This case shows the capacity of the periosteum to regenerate new bone nearly completely, even when the necrotic shaft is removed during the acute stage of the disease. The *x*-ray photograph, however, shows that the periosteum at this stage is not so easily managed in the large long bones, at least, as it is during the subacute stage.

CASE 3.—P. R., Italian laborer, 20 years old. Admitted Oct. 17, 1902. Speaks no English and history of illness is imperfect. Five or six days previous to admission received a blow over the collar bone. Five days later pain and swelling over sterno-clavicular articulation. Swelling, pain and redness rapidly increased. Over right sterno-clavicular articulation a red, painful, fluctuating swelling about two inches in diameter. All motion of the arm painful.

Operation.—October 20. An incision about three inches long was made along the inner end of the clavicle, starting from the outer margin of the sternum. An abscess of the soft tissue was opened, which discharged about an ounce of thick yellow pus. The periosteum was stripped completely from its attachment to the inner two inches of the clavicle, was thickened, injected, but showed no bone in the deep layers. The cartilage of the proximal end of the clavicle was loosened. The inner end of the clavicle itself was soft, friable and contained pus. The sterno-clavicular articulation of the clavicle was freed, and the periosteum reflected from the inner two inches of the bone, and the bone was sawn across, removing the inner two inches. The abscess was curetted and made as clean as possible, and the periosteum of the clavicle was folded together and the edges approximated with catgut sutures. Wet dressing and Velpeau's bandage were applied.

Histologic examination showed acute osteomyelitis. Culture showed *Staphylococcus pyogenes aureus* in pure culture.

Results.—Eight days after the operation a superficial abscess developed under the right arm. Otherwise convalescence

was uninterrupted and patient was discharged fourteen days after the operation with a small granulating surface over the middle of the incision and no sinus. The patient began to use his arm six weeks after the operation, and has worked as a laborer ever since Dec. 1, 1902.

Examination April 3, 1903, shows well-developed man with wide linear scar three inches long over inner end of the clavicle, beginning just inside the outer margin of the sternum. The clavicle appears normal except over one inch of inner extremity. There it is about half as thick again as normal, and is somewhat irregular in outline, not tender on pressure. Motion with the sternum is as free as on the unoperated side. All motions of the arm are normal. There is no pain on motion. Patient uses pick and shovel daily, and says he "can do everything but fight." Violent blow of fist, suddenly checked, causes a little pain at sterno-clavicular articulation.

This case is reported to illustrate the reparative power of the periosteum in the acute stage of osteomyelitis. In this case the difficulties in manipulating the periosteum were not so great as in the preceding case, chiefly from anatomic reasons.

CASE 4.—J. W. D., male, 17, school boy. Four weeks previous to admission, without assignable cause, he was suddenly seized with intense pain about the right ankle. No known primary focus of infection. Swelling rapidly ensued and extended to the knee. There were repeated chills. An abscess opened spontaneously above outer side of right ankle after

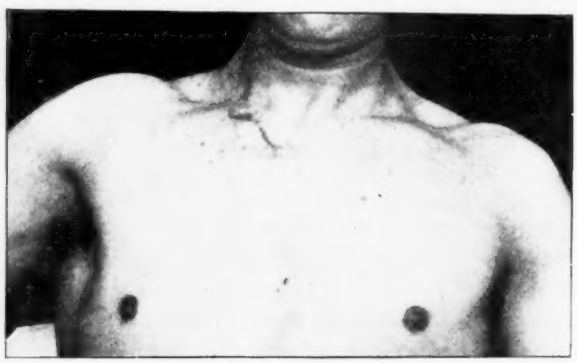

Figure 14.—Case 3. Six months after operation. Linear scar over inner end right clavicle.

seven days, and one opened just below the knee three days later.

Admitted Dec. 16, 1898. Patient showed signs of septic absorption. Right leg was swollen from ankle to knee, red, edematous and painful. There was a large sinus over the external malleolus, and a smaller one just below the tibial tubercle. Immediate operation was performed.

An incision was made four inches long over the lower sinus, and a similar one over the upper one, and two counter ones over the muscles of the leg. The tibia was bare, stripped of periosteum. Trephine hole into marrow through upper incision showed no pus, but "granulation tissue" marrow. Ankle joint apparently infected. Wet dressing and plaster.

Twelve days after the operation the foot showed a tendency to eversion. Immediate improvement in general condition followed the operation. Forty days after the operation an abscess appeared on the outer side of the leg from which pus was evacuated.

Operation.—Feb. 25, 1899, ten weeks after the primary operation, the secondary operation was performed by the writer. An incision was made over the crest of the tibia from the tibial tubercle to the lower epiphyseal line, and was carried down to necrotic bone. The periosteum everywhere was thickened, in some places being one-eighth of an inch thick, and everywhere showed in its deep layers new periosteal bone formation, crackling under the knife. The thickened periosteum was reflected from the tibia throughout the entire length of the shaft, except at the posterior tibial ridge, and various pus pockets were cleaned out with the curette. This was done to get rid of suppuration between the necrotic shaft and periosteum. The operation was checked at this point and a wet dressing and posterior splint applied, in order to give drainage and a chance for the extensive suppuration to diminish before removal of the shaft and closure of the periosteum.

Fourteen days later, the discharge and local infection having largely diminished, the periosteum was entirely reflected from the periosteum and the entire diaphysis of the tibia was removed, and the edges of the periosteum were approximated by catgut sutures. A wet dressing and a wire splint were applied. Daily dressing. There was some sloughing of the skin wound, especially over the lower third, with some eversion of edges. The upper two-thirds closed by first intention. There was practically no pain after operation.

Results.—Twenty-three days after removal of the shaft there was distinct bony induration along the line of the tibial

Figure 15.—Case 4. Dark areas along scar of tibia and over ankle are not crusts, but are due to lack of cleanliness. (Notice toes of left foot.) Inside and behind internal malleolus is a small sinus.

shaft, which soon showed as a cylindrical mass, and attained a size apparently, to palpation, as large as the original shaft. This mass constantly grew more solid, and the patient was discharged June 21, 1899, a little less than four months after removal of the shaft. At that time there was no sinus or discharge, and the tibia was solid, although somewhat springy over the lower third. Induration, apparently bony, could be felt the whole length of the tibia. The patient wore a light plaster and used crutches. He was directed to return to the out-patient department at regular intervals. He came but two times, then began to walk on the leg. After some weeks an abscess appeared over the outer side of the ankle, which opened spontaneously, but gave practically no pain. This abscess apparently originated at or just above the point of union of the new shaft and the epiphysis. Considerable inflammation and induration of the soft parts about the ankle followed, and the foot flexed at the ankle joint. Since then

the patient has walked on the leg, much of the time without any support, but at times with the aid of crutches.

At present there is considerable atrophy of the leg, with a quite rigid ankle, and foot flexed at the ankle joint and somewhat inverted. There are two sinuses, one at the outer side of the ankle joint and one over the internal malleolus. The tibial shaft is apparently complete throughout its length, and is firm and rigid, but feels considerably smaller than the normal tibia. The transverse diameter seems about the same as that of the other tibia, but the entire circumference is apparently less. This seems to have been due to some separation of the sutured edges of the periosteum.

The case is a functional failure, although the regeneration of the shaft was a partial success. The cause of the failure was apparently the development of a slight necrosis at the epiphyseal line and in the epiphysis, which, as has been said, is common. On discharge from the hospital, the result promised to be perfect, and the present state of affairs probably could have been avoided had after-treatment been followed up. The patient did not return because for a long time he suffered no pain, and because he has, even under present conditions, a fairly good functional leg. The *x*-ray shows that the

Figure 16.—Case 5. Left leg, two months after admission, one month before secondary operation.

diaphysis is much smaller than that of the normal leg. This may be due to a partial failure of the periosteum to regenerate, or may be due to the fact that the periosteum regenerates sufficient bone for function, as already mentioned.

CASE 5.—D. A. (case of Dr. H. L. Burrell), 14 years old. School boy. Two weeks before entrance he bruised the calf of the left leg, without breaking the skin. After that time he had constantly increasing pain in leg, at first dull, later severe, and finally localized over the front of the leg, with onset of fever and stupor.

Admitted Oct. 21, 1899. Septic appearance and stupid. Temp. 101.8, pulse 120. Left knee and popliteal space red, hot, tender, edematous and swollen, and extending down over upper half of leg. Knee flexed almost to right angle and swollen; patella floats.

Operation.—October 22. Multiple incisions about the knee and evacuation of a large amount of pus. Femur not involved. Incision over crest of tibia showed bone bare and periosteum elevated. Wet dressing. *Staphylococcus pyogenes aureus* present in pure culture.

Results.—Immediate general improvement. Profuse discharge of pus continued and shaft of tibia became brown and perforated.

Three months after this operation secondary operation was performed. An incision was made along the crest of the tibia from the tibial tubercle to two and one-half inches above the internal malleolus. Periosteum retracted and separated and entire diaphysis removed. The trough of slightly ossified periosteum molded into position and closed with interrupted sutures. Skin wound also closed and covered with silver foil. Sterile dressing, posterior wire splint. Tourniquet removed after the dressing. The first dressing was done on the tenth day. Upper and lower ends of incision healed by first intention with clean granulations over middle third. Thirty-seven days after the operation the leg showed formation of new shaft. One month later the leg was firm except for two small sinuses, one at junction of upper and one at junction of lower epiphysis with shaft. Parents refused to have sinuses curetted. On May 2, 1899, a little over three months after second operation, patient was discharged wearing a plaster, with crutches. The two sinuses still persisted, and there was slight mobility at the upper one.

Figure 17.—Case 5. Three years after secondary operation. No shortening or atrophy. Linear scar over tibia.

The sinuses both closed in about four weeks, and the patient walked on the leg two months after leaving the hospital, and has done so ever since.

Examination in April, 1903, shows well-developed leg, no shortening or deformity or atrophy. A linear scar along the crest of the tibia. No sinus. No pain or subjective symptoms for two years. Tibia solid, of normal size, and by palpation is exactly like the sound one except for slight irregularity in contour. Perfect functional and cosmetic result.

This case shows practically perfect regeneration, after entire removal of diaphysis.

CASE 6.—F. N., patient of Dr. G. H. Monks, boy of 11. School boy. Seven weeks before entrance seized with pain in left ankle, at first dull, soon becoming intense and throbbing. The next day swelling of leg. On the third day an incision into the soft parts over external malleolus and evacuation of pus. This gave some relief until six days before entrance, when there was an exacerbation of symptoms.

Admitted Sept. 15, 1898. The leg was swollen, with tenderness chiefly at lower end of fibula. An ulcer presented over

the external malleolus. Fibula was bare over lower five inches and a profuse discharge of pus. Wet dressing and fixation to clean up the region for operation.

Operation.—One month later the secondary operation was done. An incision was made the whole length of the fibula. The entire diaphysis was removed. Wound was packed with gauze and a wet dressing applied.

Results.—Immediate improvement in general condition. The wound closed by granulation. Two weeks later two small sinuses persisted. Two months and ten days after secondary operation patient went out wearing a plaster. Boy walked on the leg about six weeks after leaving the hospital, and has done so since.

Examination in April, 1903, shows somewhat atrophied leg, with linear scar along entire fibula region. Fibula can be felt, apparently complete and firm. Perfect functional result.

CASE 7.—H. S., 14 years old. School boy. Five days before

Figue 18.—Case 6. Removal entire diaphysis of left fibula. Four years after secondary operation. Considerable atrophy, about one-half of an inch shortening.

admission spontaneous pain in right knee, very severe, so that he was unable to walk. Had chills and fever.

Admitted Sept. 14, 1900, for "typhoid fever." Stupor, mild delirium, leucocytes 8900, temp. 102.5. Three days later swelling of right leg from knee to ankle appeared and patient was transferred to the surgical ward. Leg swollen. Knee swollen and flexed. Cut six inches long over crest of tibia, beginning at tibial tubercle, evacuated much pus; periosteum bulging and tibia stripped. Trephine hole into tibia also evacuated pus from the bone. Opening enlarged downward three inches until no more pus escaped from the marrow. No attempt to close periosteal wound. Packed, wet dressing and plaster bandage. After operation, temp. 103, but normal on twelfth day. Wound closed by granulation, leaving bare bone at the bottom. Discharged November 13 with sinus, with direction to return for secondary operation.

Operation.—Feb. 7, 1901, he returned for the secondary operation. February 15 incision from tibial tubercle to junction of middle and lower third of leg. Upper third of tibia necrotic, periosteum thickened and crackling. Periosteum reflected from upper third of leg. Necrotic shaft removed from just below epiphyseal line to one inch below bottom of old trephine opening, until vascular marrow canal was reached. Upper end of lower fragment beveled off to allow approximation of lower fold of periosteum, but a triangular space had to be left between epiphyseal line and folded periosteum. Edges of periosteum united by interrupted chromic gut sutures. Skin wound closed with similar sutures. Dry dressing and plaster. First dressing in three days. Some sloughing of skin edges, approximated with adhesive plaster. Wound closed rapidly, mostly by first intention. Bony column first noted on eighteenth day. On twentieth day patient fell out of bed and struck the leg, and soon after an abscess developed on the outer side of the leg, connected with the triangular space just below the epiphysis, and a little necrotic bone was curetted out. Ten days later another fall, knee swelled, and patient began to have chills, and two months after secondary operation knee joint was opened and purulent fluid removed. Knee was drained by gauze wicks. From that time patient continued to improve, knee joint closed, and on Feb. 23, 1901, patient was discharged wearing a plaster, with firm tibia and

Figure 19.—Case 7. Removal upper third right tibia. Incision over knee joint and linear scar over upper half of tibia. Four years after operation.

a small sinus just below epiphysis. The sinus closed in about four weeks.

Results.—The patient walked on the leg three months after leaving hospital, and has done so ever since, without any subjective symptoms.

Examination April 2, 1903, shows solid shaft of tibia without sinus, of practically normal size, possibly a little larger than the normal tibia and a little irregular in outline. No tenderness. Motions at knee joint perfect, except for a diminution of flexion by less than ten degrees. Scars of incision over tibia and into joint healed. Walks without limp. Perfect functional and cosmetic result.

This case shows the possibility of removal and regeneration of a necrotic portion of the shaft. It also illustrates the possibility of an infection of the knee joint by extension, and, furthermore, shows that the last place to heal usually is the interval just below the epiphyseal line.

CASE 8.—R. L. T., female, 24 years old. Nurse. Twelve years previously sprained left ankle. Four years previously broke both bones of left leg, tibia just above the ankle and

fibula at the middle. Six months after fracture had pain and swelling about left ankle and a small bit of bone was discharged through a spontaneous sinus. Sinus healed in two months. One year later another attack of pain, and a small spicule of dead bone removed by operation. From that time on had recurrent attacks of pain, often severe.

Admitted Oct. 24, 1900. Painful, tender swelling over lower third of left tibia with scar of old operation. Rest in bed and poultices. Radiagraph showed no bone focus, and patient went out with pain relieved on November 1. She was comfortable for a few weeks, when pain recurred.

Figure 20.—Case 7. X-ray, tibia. Four months after primary drainage operation. Front view. Marked thickening from formation of periosteal bone.

She was readmitted June 23, 1901, with tender tibia and limited ankle motion. June 26, 1901, an incision was made by the surgeon then on duty and a trephine hole made above and below the epiphyseal line. From the upper trephine hole a thin pus escaped, and the lower one opened into a thin-walled bony cavity filled with pus. The cavities were packed and a wet dressing and plaster bandage applied. The wounds in soft tissue closed by granulation, but the discharge from the sinuses was profuse and great swelling of the soft parts ensued. Amputation was considered.

Operation.—July 23, 1901, the writer operated. There was a sinus leading into a cavity in the lower end of the diaphysis, filled with pus and granulations. There was a similar sinus and cavity in the shaft of the tibia about four inches above the epiphyseal line. The two cavities did not connect. The cortex of the tibia between the two trephine holes was white, stripped of periosteum and necrotic, forming a fixed adherent sequestrum. The posterior portion of the cortex of the lower four inches was closely adherent to the periosteum. The periosteum was thickened and showed moderate periosteal ossification. The shaft of the tibia was removed from the epiphyseal line to about an inch and a half above the upper sinus, except for a thin layer of cortical bone at the bottom. The marrow canal above the sinus was closed by rather dense scar bone, and the tibia was removed until the upper limits of this endosteal dense bone was reached, i. e., until vascular marrow was reached. A thin strip of cortical bone adherent to periosteum was left at the bottom of the cavity, because it

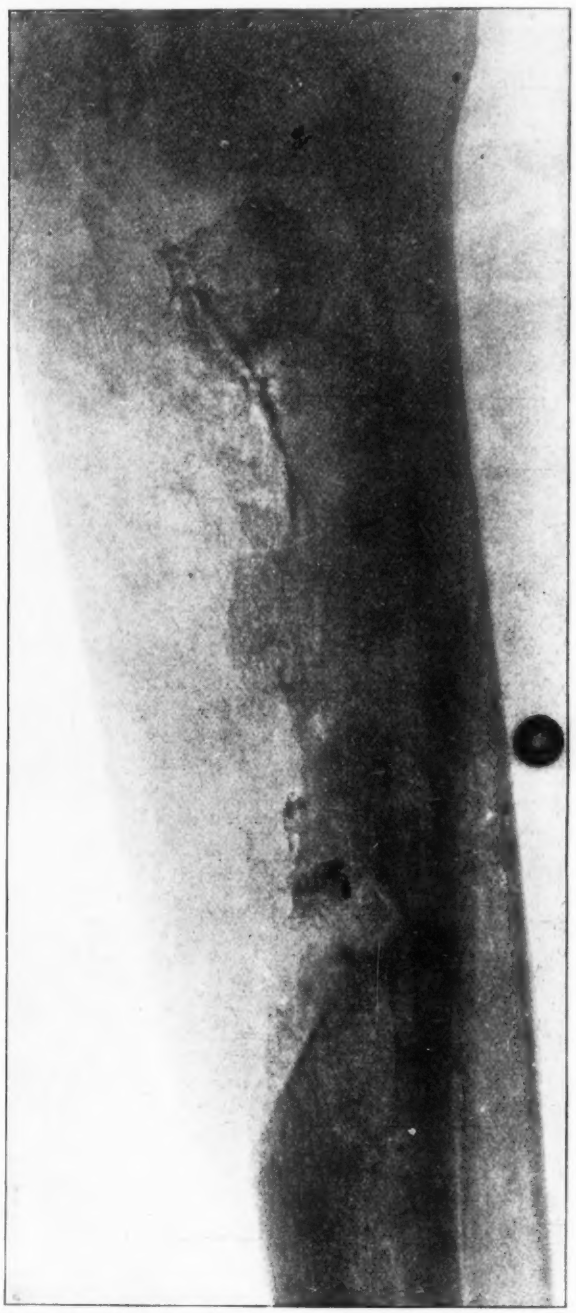

Figure 21.—Case 7. X-ray of tibia. Two months after secondary resection, upper portion of tibia. Side view. Regeneration of bone most marked posteriorly. Beveling of lower fragment is obvious.

was thought that this thin layer was viable on account of its attachment to the periosteum, and would serve to preserve the contour and length of the limb. This strip of periosteal bone was about one-eighth of an inch thick and one-half an inch wide. (See Fig. 30.)

All soft infected tissue was carefully curetted and the cavity was sterilized by 95 per cent. carbolic acid, followed by alcohol. The lower end of the upper fragment was beveled off to allow as accurate as possible apposition of the periosteum. The thickened crackling periosteum was approximated by three chromic gut and one silver wire suture which passed

Figure 22.—Case 7. X-ray, tibia. Five months after secondary resection. Front view. Upper end of bone very wide (soft bone with overgrowth). Marrow canal not evident.

about the cortical remnant and outside the periosteum. There was a triangular dead space unavoidably left just above the epiphyseal line, and, of course, a similar smaller space just above the strip of cortical bone. The defect in the soft tissues was closed by sliding a skin flap across laterally and fastening it by interrupted gut sutures. A wet dressing and a plaster were applied.

There was some sloughing of the edges of the wound, and after about two weeks a sinus developed just above the epiphyseal line. The upper part of the wound closed by first intention. Suppuration from the sinus was profuse for three weeks. Two months after the operation a cylinder of fairly solid bone could be felt completely filling up the defect. Sinus had closed almost to level of the skin, and patient left the hospital Sept. 26, 1901, two months after operation, with plaster bandage and crutches. The sinus closed promptly, and the leg was comfortable for about two months. Then several small abscesses developed over the silver suture, which finally was removed in December, 1901. In January, 1902, the leg was completely healed and the patient walked without support. With the beginning of warm weather small abscesses again appeared, and on standing or walking the leg was painful. In July, 1902, a sinus developed and the patient came to the hospital. July 10, 1902, the sinus was curetted and found to extend outside the periosteum to a bit of apparently bare bone on the outer surface of the new shaft. This bare

Figure 23.—Case 8. Removal, lower third, left tibia twice. Moderate atrophy left leg; some pigmentation of scar. No sinus.

bone probably was some fragment of the cortical strip left behind at the operation. The wound closed slowly by granulation, but the discharge and pain continued and the leg swelled.

Aug. 7, 1902, an incision five inches long was made along the old scar. The periosteum was one-eighth of an inch thick. There was some suppuration of the surface of the newly-formed diaphysis. The periosteum was reflected. The new diaphysis was solid bone with no medullary canal. Fearing that there would be little power of repair of this dense bone, four inches, i. e., nearly all of the new solid diaphysis, were removed from just above the epiphyseal line up to vascular marrow. The periosteum was approximated by interrupted chromic gut sutures, and the wound of the soft tissues was closed. Wet dressing and plaster were applied. There was considerable pain for six days after the operation, referred to the external

malleolus, the soft tissues over which were opened. Patient was mildly delirious for several days. There was almost no discharge from the wound in front of the tibia. Five days after the operation the patient was removed from the hospital, during my absence, against advice.

After leaving the hospital another abscess developed on the outside of the leg. This healed in three weeks. By Oct. 1, 1902, solid bone had appeared and sinuses were closed. In December patient walked with a cane. Since March, 1903, patient has walked without bandages or support.

Results.—Examination in April, 1903, showed patient walking without limp or pain. The leg is a trifle smaller than the sound one, and shows a little anteroposterior bowing in the lower third. The leg is one-half inch short. The scar is completely healed; there has been no sinus for six months. Tibia is solid throughout, width is a little greater than that of the normal tibia, but diameter on the whole seems a little less. There is, however, marked posterior bowing of tibia at the site of the operation.

The case is of particular value. At the first resection of the tibia I think it was a mistake to leave the posterior

Figure 24.—Case 8. Removal, lower third, left tibia twice. Very slight antero-posterior bowing of left leg in lower third.

shell of cortical bone, as probably the persistent formation of abscesses was due to a failure of all of that shell to retain its vitality. The regeneration of bone by the periosteum, however, was complete, and, in fact, more perfect than it was after the second resection. The second resection was done practically on an unossified periosteum, and the regeneration has been fairly successful. The suppuration which followed, however, apparently caused some gaping and separation of the infolded periosteum, and explains, I think, the backward bowing of the new diaphysis. The case also illustrates the undesirability of unabsorbable metal sutures. The functional result is at present perfect, and the cosmetic effect nearly so. The case emphasizes the extraordinary regenerative power of the periosteum at any stage of the disease.

CASE 9.—J. P. R. School boy, 14 years old. Sixteen days before admission he bathed in very cold sea water. Three days later pain in left shoulder, soon becoming severe. Swelling appeared in a few days. Temperature became high and repeated chills. Admitted to the medical side as "articular rheumatism." Soon transferred to surgical. Temp. 103.4, pulse 124. Septic appearance and mental stupor. Left shoulder and upper arm much swollen, red, edematous and exceedingly tender and painful on motion or pressure.

May 12, 1900. Incision six inches long from tip of acromion to lower insertion of deltoid muscle. Subcutaneous tissue edematous. Deltoid fibers were separated and showed bulg-

Figure 25.—Case 8. X-ray. Removal, lower third, left tibia twice. Six weeks after first removal of lower third of tibia. Shows tapering of upper end of tibia, silver wire suture and deep layer of cortical bone.

ing periosteum. Incision of periosteum evacuated several ounces of greenish pus. A one-half inch trephine hole through the cortex, just below upper epiphyseal line, gave vent to several drams of pus. Trephine hole enlarged down to the deltoid insertion until pus no longer escaped. Marrow was dark red and gelatinous. Marrow was not curetted nor disturbed. The wound was packed open with iodoform gauze and a big wet dressing and Velpeau bandage applied. *Staphylococcus pyogenes aureus* was present in pure culture. Immediate im-

provement in general condition. Wound closed by granulation, but a sinus leading down to bare bone persisted. The patient was discharged two weeks after the operation, to come in later for secondary operation when periosteum had sufficiently thickened to maintain contour of limb.

Patient returned eighteen weeks after discharge, i. e., twenty weeks after the primary operation. Sinus meanwhile had been carefully kept open to allow of very free drainage. There was no limit to passive motion nor any pain. X-ray photograph showed much periosteal thickening outside the necrotic shaft.

Operation.—Sept. 28, 1900. An incision five inches long made through the old scar and sinus, beginning one inch below the tip of the acromion. The granulations of the sinus were curetted and the edges excised. The necrotic old shaft was lying in a cylindrical cavity of periosteal bone about one-half inch thick. The shaft was free at the upper end, but firmly attached below. The necrotic shaft was removed in two pieces with chisel and gouge and forceps, through the opening in the periosteal shell left over the old trephine holes, and was about three and a half inches long. The cavity had walls of vascular young periosteal bone. The cavity was packed with iodoform gauze. The shell was sufficiently rigid to maintain the contour of the limb.

Figure 26.—Case 8. X-ray. Removal, lower third, left tibia twice. Front view. Six months after first removal of lower third of tibia.

The cavity closed rapidly from the first and by the end of two weeks was healed nearly to level of skin and no bare bone could be felt. Seventeen days after the operation the patient was discharged with a granulating wound, wearing an internal angular splint.

Three weeks later a small sinus developed at the bottom of the scar, and a small bit of bone was discharged. Ten weeks later a similar sinus occurred with discharge of a small bit of necrotic bone. The sinus did not completely heal for six months after the operation.

Figure 27.—Case 8. X-ray. Removal, lower third, left tibia twice. Lateral view. Nine months after first removal of bone.

Results.—Examination in March, 1903. Arm has been completely healed for over a year. Wide linear incision extends from tip of acromion to the insertion of the deltoid, largely due to a separation of the deltoid fibers by the scar. The humerus is solid throughout, of apparently normal size, but a little more irregular than the normal humerus. Passive

motion at the shoulder is unlimited. Voluntary motion is perfect except in elevation of arm from the side, due apparently not to loss of muscular power, but to separation of deltoid fibers. Functional and cosmetic effect nearly perfect.

The case illustrates the power of central growth of the earliest stage of the periosteal shell, in marked contrast to the lack of such power that is seen in old involucra, after conversion into ivory bone.

CASE 10.—G. Z., 18 years old. Brass finisher. One week before admission a pimple appeared on chin, below the tip. The next day marked swelling of face.

Figure 28.—Case 8. X-ray. Removal, lower third, left tibia twice. Lateral view. Nine months after second resection.

Admitted Oct. 8, 1900. Much swelling of left side of face and chin, with edema, swelling, redness and pain. No swelling in mouth and all teeth sound or filled on affected side. An incision of soft parts was made, evacuating about an ounce of pus. The edema and pain continued to increase, and a few days afterwards a second incision was made along the lower edge of the ramus of the jaw and a small piece of the internal shell of the ramus was removed. The boy was discharged eight days later with a discharging sinus leading down to necrotic alveolus, and urged to return for observation. After leaving the hospital all of the teeth except the last molar on that side became loose and came out, and a considerable piece of the alveolar process was removed through the mouth. The bone of the jaw of the left side rapidly increased to double normal size from formation of periosteal shell. Dead bone could be felt through sinus in mouth and through external sinus.

March 13, twenty weeks after primary operation, patient was

Figure 29.—Case 8. X-ray. Removal, lower third, left tibia twice. Front view. Nine months after second resection.

readmitted. Jaw of left side nearly double normal size and causes marked deformity. The sinus below the left ramus persists. The thickening is almost entirely bony thickening, with but little edema of the soft parts. The jaw was at that time considered to be rigid enough to allow removal of necrotic ramus, and yet young enough to allow of probable central growth.

Operation.—An incision made from in front of the angle to nearly the tip. Periosteum was thickened to about one-

quarter of an inch and quite rigid. A trephine hole, half an inch in diameter, was made near the tip of the jaw through the periosteal bone, and the opening was enlarged backward. Beneath the shell was necrotic ramus, surrounded by pus, and this was removed in one piece about two inches long, beside some smaller fragments. The cavity was curetted to remove all fragments of dead bone, and the cavity was closed except for a small wick in front. The wound closed by first intention except for the wick. The patient was discharged eight days later.

Results.—A month later a small abscess formed near the angle of the jaw, which apparently did not connect with dead bone, for it healed promptly after incision. The sinuses closed in about three months, and ten months after the operation the jaw was markedly reduced in size.

Examination April 15, 1903, shows the outline of the face nearly normal, as bony thickening of jaw has quite disappeared. Linear incisions along lower edge of ramus. Last molar on that side remains. All other teeth gone in lower jaw to first molar on opposite side. Ramus of normal thickness laterally, but not so thick vertically as normal, apparently because alveolar process did not regenerate. No sinus for a year and a half.

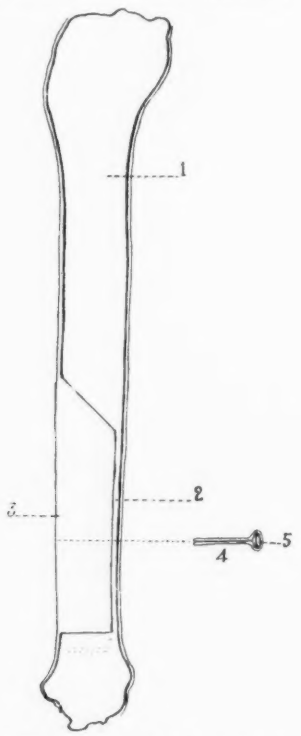

Figure 30.—Diagram to illustrate amount of bone removed in Case 8. 1. Upper portion of normal diaphysis. 2. Layer of cortical bone not removed at first resection. 3. Upper level of infolded periosteum. 4. Transverse section through infolded periosteum and posterior strip of cortical bone. 5. Posterior strip of cortical bone.

This case, like the preceding, shows the power of central growth of the early periosteal shell.

CASE 11.—C. C., Italian, housewife, 24 years old. Speaks no English and history is imperfect. When 14 years old bruised the leg. Shortly after the leg swelled, patient was very sick, and an abscess formed, which broke and discharged pus and dead bone ever since at intervals.

Admitted Oct. 22, 1900. At the upper end of right tibia marked swelling and tenderness. Scar of previous injury. Very painful. Joint motions normal.

Operation.—Oct. 24, 1900, an incision was made over crest of tibia, opening an abscess of considerable size in the soft parts. Bone was covered with thickened periosteum, 1/16 inch thick. Periosteum was retracted and tibia of nearly double normal size, very dense and hard, exposed. A trephine hole through a cortex of more than double normal thickness opened a pus cavity, containing about half an ounce of yellow pus. The marrow canal was practically occluded above and below this cavity by dense endosteal bone. With chisel and gouge the cavity was enlarged upward and downward until vascular marrow was reached. The cavity was cleaned out

Figure 31.—Case 9. Removal upper half diaphysis, left humerus. Three years after operation.

with 95 per cent. carbolic acid, followed by alcohol. All of the abscess wall also was curetted and carefully removed. The cavity was filled with blood clot according to Schede's method.

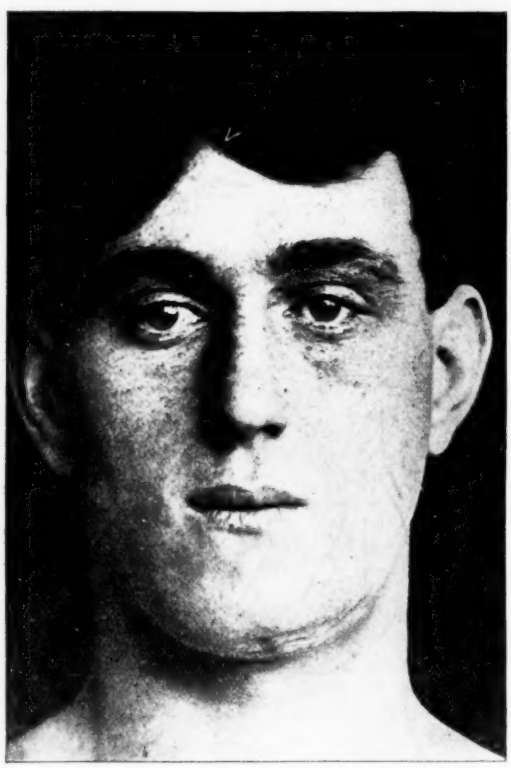

Figure 32.—Case 10. Front view. Thirty months after removal of two and one-half inches of ramus of left lower jaw. Contour of face has returned nearly to normal.

The clot broke down and disintegrated and left the cavity lined with pale, unhealthy granulations.

Nov. 28, 1900, an attempt was made to utilize the regenerating power of the periosteum to obliterate the bony defect.

An incision six inches long was made along the crest of the tibia, including the sinus. The periosteum was reflected and the dense tibia removed for a length of about four inches, except for a thin layer of cortical bone, attached to the periosteum, at the back of the tibia, as in Case 9. The tibia was practically all ivory bone and no definite marrow canal was seen, but the cavity was enlarged in both directions until the dense bone became more vascular. The periosteum then was approximated and sutured, although a triangular dead space had to be left at the junction with each portion of the shaft. The skin also was sutured and pressed firmly on the bone. A large plaster bandage was applied.

Results.—There was some sloughing of the edges of the wound at the middle of the incision, but upper and lower portions healed by first intention. Bony thickening was evident at the end of forty days, although a small sinus persisted. The patient was discharged wearing a plaster three months after the operation with a rather soft tibia of about one-half normal size, and a small sinus, in which dead bone could not be felt. The patient walked on the leg four and one-half months after the operation, and has done so ever since.

Examination April 2, 1903. Patient walks without limp. Leg is considerably smaller than normal leg. There is a marked concavity of the leg, beginning just above the tibial tubercle and extending down to the middle. The tibia is firm, not tender, a little wider than the normal tibia, but of about one-third less diameter. There is a slight vertical trough in the front surface of the bone, in the middle of the incision. It has not been possible to get the patient to come for an *x*-ray picture.

The case is not a complete success. The regeneration of the tibia has been sufficient to give a satisfactory functional result, but the persistence of the sinus is disappointing. I suspect that the cause is the cortical strip that was not removed.

The cases above presented are not selected cases, except Cases 1, 2, 5 and 6. Those cases were operated on by other surgeons, and by their permission have been presented here because they illustrated some special feature of the process of bone regeneration. The cases do include all of my own cases of disease of the large bones operated on by the method previously recommended, in which sufficient time has elapsed to determine the result of operation, except one case of resection of the inner half of the clavicle for tubercular disease. In that case there was complete regeneration of the removed portion of the clavicle, with a satisfactory sternoclavicular articulation. I have also in a few cases operated on small bones, e. g., phalanges, by this method, and succeeded in obtaining complete healing and regeneration. There has been a considerable number of cases operated on by this method by other surgeons at the Boston City Hospital, with exceedingly satisfactory results.

CONCLUSIONS.

A careful study of the cases here reported will show that the following statements in regard to the treatment of osteomyelitis are justified:

1. In the acute stage of osteomyelitis, drainage of abscess in the soft parts alone is not sufficient. The bone marrow is infected, and must be drained. Removal of a sufficient amount of cortical bone alone is all that is required to give perfect drainage to the bone marrow. Curettage and disturbance of the marrow cause extensive destruction of the endosteum, which, if left alone, has in a limited number of cases operated on early, sufficient power of regeneration to repair the bony defect without the formation of a sequestrum. Under those circumstances a very early operation on the cases is necessary.

2. In the subacute stage it is desirable to remove the necrotic shaft, completely or partially, at an early stage in order to take advantage of the power of regeneration of the periosteum. The periosteum either before or after the beginning of periosteal ossification has the power of regenerating a completely or partially removed shaft of bone.

3. For mechanical reasons the manipulation of the periosteum is easier after ossification of the periosteum has begun, but while the membrane still is plastic. Moreover, the rapidity and surety of perfect regeneration seem greater at that time.

4. The operation consists of an incision through skin and ossified periosteum down to necrotic shaft, reflection of the periosteum, removal of the shaft, either entire or partial, folding of the plastic periosteum in such a way as to approximate the internal layers, suture of the edges by absorbable sutures, suture of the soft tissues, with, in both cases, provision for moderate drainage and complete immobilization.

5. The success of the operation is naturally greater when asepsis is provided for by careful drainage preceding the operation and by careful removal of all infected material and tissues at the time of operation.

6. After removal of the necrotic shaft well-marked ossification of the new periosteal shaft appears between the twentieth and fortieth days, and the shaft is solid enough for use in locomotion in from four to eight months. If the epiphyseal line is extensively destroyed, considerable shortening of the limb may result.

7. The regenerating bone at first becomes much larger than the original shaft was and is entirely composed of solid periosteal bone, with no marrow canal. This enlargement probably is due to the fact that the bone is less completely calcified than it is later. In time the size of the bone decreases almost or quite to that of the original shaft, and, finally, judging from *x*-ray photographs, a marrow canal is formed. This fact suggests that the size of bones may be due to two factors, heredity and environment, and that the ultimate size of the bone, therefore, is due to the function required of it.

8. The chief difficulty in completing the restoration of the shaft is to obtain complete union of the regenerated shaft to the epiphyseal line or to the portion of the normal shaft that remains. Slight necrosis and suppuration may persist at this point after the repair otherwise is complete, and may demand minor operations to remove small fragments of necrotic bone. Union at these points may be delayed, but ultimately always has taken place.

9. The best time for the operation ordinarily is about two months after complete drainage of the acute infection.

10. This operation is the operation of preference, and is especially applicable when an accessory bone which can act as a splint is present.

11. The anatomic, functional and cosmetic results obtained by this operation are much superior to those obtained in any other way in cases of large bony defects due to acute infection of bone.

12. Where no accessory splint bone is present it may be impossible, in special cases, to maintain the contour of the affected bone by the above-mentioned method. In such cases advantage can be taken of the power of central growth possessed by the shell of periosteal bone in its *early* stages. This means that the necrotic bone must be removed just as soon as the periosteal shell is sufficiently advanced and solid to maintain contour and bear the weight of the limb. Roughly, this stage is reached when the thickness of the periosteal shell is equal to one-quarter of the diameter of the original shaft.

13. The time when this condition exists can be determined by *x*-ray examination and by palpation.

14. If the necrotic shaft is removed at this time it leaves a solid cylinder of periosteal bone, very vascular, but partly calcified, analogous to the bone seen in an early external callus, and this shell has sufficient power of central growth to fill up large cavities. The rate of central growth seems to be markedly slower than that of peripheral growth. Persistence of sinuses is longer than in the preceding method, partly from a delay of closure of the cavity, and possibly from a failure to remove small fragments of necrotic bone at the time of operation.

15. This method of operating leaves at first bone very much larger than the original bone, but, as in the preceding case, ultimately the bone diminishes in size and slowly approximates that of the original bone.

16. In the chronic cases more or less sequestrum surrounded by an enormously thick shell of dense cortical, more or less ivory-like bone, exists.

17. The power of repair of dense cortical bone is very slight or practically wanting. Removal of sequestra leaves a more or less extensive cavity in bone, surrounded by a wall of dense bone, lined with unhealthy granulations, which has no tendency to close.

18. The most satisfactory methods ordinarily recommended for the closure of such defects are the aseptic blood clot, or obliteration of the cavity and approximation of skin flaps. The aseptic blood clot aims to fill the defect with dense scar tissue, but does not lead to regeneration of bone, and requires for its success greater asepsis than ordinarily can be obtained in extensive osteomyelitis. The skin flap method may close the cavity, but does so at the expense of great bony destruction.

19. From one semi-successful case, from a consideration of the general process of regeneration of bone by the periosteum, and the successful results obtained in the subacute cases, it seems likely that better results can be obtained by removal of both sequestrum and involucrum and the use of the regenerative power of the periosteum.

20. In removing a portion of a shaft under such circumstances, the excision should be carried sufficiently far into the normal shaft to get above a medullary canal, occluded by dense, ivory bone, and reach vascular marrow.

21. Finally, the most satisfactory results in treatment of acute osteomyelitis can be obtained by complete drainage of soft tissues and marrow in the acute stage, with the removal of extensive necroses, if they occur, at a secondary operation undertaken about two months later, and by adaptation of the regenerative power of the periosteum for the formation of a new shaft.

[The discussion on the papers of Drs. Bottomley and Nichols appeared in THE JOURNAL July 25, 1903.]

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THE WANING GLORY OF THE LEUCOCYTE.

As the chief hero in the contest between the bacterium and the man, the leucocyte seems to be suffering the fate of many another shining light of battle, and its once high position is being most vigorously assailed. At first, the only means of defense against bacteria that had once gained a foothold and begun to multiply, so far as known, was the intrepid leucocyte, which was supposed to attack the most virulent bacteria, engulf them while in full activity and either to digest them or die in the attempt. Through the work of Metchnikoff and his school, particularly, this power of the leucocyte was made familiar to all, and the subject was elaborated vigorously. It was not long, however, before voices were raised in opposition, contending that the leucocyte was not so much of a hero after all, but merely a scavenger that picked up the bodies of dead or crippled bacteria and destroyed them, but was unable to give much protection against bacteria that were virulent. The injury to the bacteria, according to these investigators, was essential for successful phagocytosis, and was accomplished by soluble substances present in the serum which possessed marked bactericidal powers. Thus arose two schools—the humoralists and the supporters of the phagocytic theory. Naturally enough most of the French pathologists followed Metchnikoff and their work was influenced by his ideas, while the Germans were solidly lined up on the opposite side.

At last the defenders of the leucocyte were forced to recognize the actual fact of the presence of bactericidal substances in normal blood plasma, and they then fell back to the ground that, although the leucocyte could pick up and destroy virulent bacteria, yet they were much better able to accomplish this if the organisms had been previously injured, and that the substances that injured the bacteria were produced and secreted by the leucocytes. Destruction of bacteria, they contended, was the function of leucocytes, which was accomplished either intracellularly after phagocytosis, or extracellularly by bactericidal products of the leucocytes, or by combining the two processes. As a compromise that recognized the potencies of the serum, this view met with considerable favor, particularly as there were many features of immunity that bore it out, and Buchner, Gruber and others were convinced that "alexin," the bactericidal constituent of blood plasma, was a product of the leucocytes and in nature like a proteolytic enzyme. Ehrlich and his school, by showing that the alexin of Buchner really represents two uniting substances, the "complement" and the "intermediary body," made necessary further modification of the leucocyte's part in immunity, which developed in the form of an assumption that the complement, which bears much resemblance to a ferment, was the contribution of the leucocyte, particularly the polymorphonuclear neutrophile.

But even this last shred of honor is threatened, and particularly by the interesting studies of Petrie.[1] Using the method of Rowland for obtaining the inmost constituents of cells, which consists of triturating the cells after they have been made brittle by exposure to the temperature of liquid air, he obtained extracts of leucocytes. Although this process does not destroy the bacteriolytic properties of normal serums, the extracts of the leucocytes so obtained were found to be entirely devoid of bactericidal powers, showing that they contained nothing resembling an "alexin." Neither did they contain anything in the shape of a bactericidal "complement," for they could not reactivate the normally bactericidal serum that had been deprived of complement by heating. This was found to be the case with the leucocytes of the normal rabbits when tried against typhoid bacilli, for which the serum of rabbits is powerfully bactericidal, and the leucocytes of rabbits rendered highly resistant to typhoid bacilli by immunizing were equally devoid of alexin or complement. From these experiments, which are in accord with others performed by different methods, it appears that Metchnikoff's view that the bactericidal substances of blood exist in the bodies of the leucocytes to be liberated on their destruction, can not be accepted. There remains still the possibility that the leucocytes really do secrete bactericidal substances, but that they do not exist preformed within the cell. In other words, they resemble the inactive zymogens that become active on or after secretion.

In any case, however, there is a strong tendency, based on good grounds, to rob the leucocyte of much of its former significance. Yet it is still to be contended that the leucocytes must have some function, and this is almost certainly connected with the resistance of the body against infection, and even if it does not happen to be just what Metchnikoff thought, yet it is probably of importance, else why the leucocyte?

OCHRONOSIS.

In a former issue[2] we reviewed editorially the important features characterizing the anomaly known as alkaptonuria. It was pointed out that Garrod regards it as a "sport" or an alternative mode of metabolism. Until a very recent date the only clinical significance that alkaptonuria possessed rested in the fact that a number of the cases had been mistaken for diabetes

1. Jour. of Path. and Bact., 1903, ix, 130.
2. THE JOURNAL, Jan. 30, 1904, p. 313.

mellitus, owing to the power the urine possessed of reducing copper solutions. Due consideration of the other characteristics of the urine should have obviated this mistake, however. The vast majority of the patients have no symptoms referable to the anomaly, and it appears to have no tendency to shorten life.

Recent observations indicate that a pathologic condition of great interest and rarity is associated with and probably due to the metabolic disturbance in alkaptonuria. Osler[2] has just reported two cases of ochronosis, or pigmentation of the cartilages, in alkaptonuric brothers, both of which cases have already been published in the literature as alkaptonurics, and constituting two of the four instances of this anomaly observed in this country. In 1866, Virchow described a remarkable blackening of the cartilages in the body of a man, aged 67 years, who had died of aneurism, and suggested the name "ochronosis" for the condition. Previous to the two cases here referred to, only seven instances have been recorded. One or two of them were described as having melanuria, but Albrecht,[3] who reported the seventh case in 1902, deserves the credit of first suggesting an association between the disease and alkaptonuria. The urine of his patient was dark colored and reduced sulphate of copper solutions, but hemogentisic acid was not absolutely demonstrated.

Osler's first case is a man 57 years of age. At the present time the sclerotic coats of the eyes show areas of black pigmentation in the exposed portions. The cartilages of the ears, particularly the concha and helix, show a remarkable blue-black discoloration. A noteworthy feature not previously recorded is that a butterfly shaped area of the skin over the nose and cheeks is also markedly pigmented, the pigmentation resembling powder marks very closely. The discoloration of the sclerotics and of the ears was present but less marked eight years ago. The other brother, 49 years of age, presented a similar but less striking pigmentation of the sclerotics and cartilages of the ears. The patient had noticed the pigmentation for several years. There is little doubt but that the deep-seated cartilages of both these patients would manifest the same changes.

The probabilities are that ochronosis is another manifestation of the metabolic disturbances in alkaptonuria, which previously had been recognized only by the urinary changes. Some of the cases of ochronosis have not been associated with alkaptonuria, and Garrod thinks it is possible that there may be two distinct classes. An interesting fact is that Ogden's alkaptonuria case, another of the four American cases, has just been found to have the ochronotic pigmentation. Whereas all alkaptonurics do not have ochronosis, it will probably be shown that all ochronosis cases exhibit alkaptonuric changes in the urine.

2. The Lancet, Jan. 2, 1904, p. 10.
3. Zeitschrift für Heilkunde, 1902, vol. xxiii, p. 366.

ABSORPTION OF TUBERCLE BACILLI FROM THE ALIMENTARY TRACT.

It is frequently urged, as an argument against Behring's theory as to tuberculous infection taking place through the intestinal tract, that if this were true, then primary tuberculous lesions in the intestines of tuberculous children and adults would be a common finding at necropsy instead of a very rare one.

Koch's paper at the London Congress, in which he asserted that no case of tuberculosis can be considered of alimentary origin unless a primary tuberculous lesion is found in the intestinal tract, gave a new impetus to the controversy over this question as long ago as 1890. Dobroklonski, working under Cornil, had practically proved that tubercle bacilli can pass through an intact intestinal mucosa, for he demonstrated the presence of tubercle bacilli in the solitary follicles, the mesenteric lymph glands and liver of guinea-pigs, which had been fed on glycerin bouillon cultures of this bacillus, and whose intestinal mucosa proved to be without demonstrable lesion. Dobroklonski, however, was unable to discover the path traveled by the tubercle bacilli. This missing link was supplied by Nicholas and Dercas, in Arloing's laboratory, who fed fasting dogs a mixture of greasy soup and milk in which had been incorporated large quantities of potato culture of tubercle bacilli. The dogs were killed about three hours after feeding, the chyle collected from the thoracic duct and injected into the peritoneal cavity of guinea-pigs. Positive results were obtained from two of the six dogs.

Still more convincing results have just been obtained by Ravenel,[1] bacteriologist to the State Live Stock Sanitary Board of Pennsylvania. He was led to this investigation by having repeatedly observed extensive lung lesions in animals fed with tuberculous material, in whom the intestinal lesions were either absent or very slight. Ravenel followed the procedure of Nicholas and Dercas, using healthy fasting dogs, and preparing them by purgation and a twenty-four-hour fast. A single dose through the stomach tube was then given of an emulsion of warm water and melted butter with which tubercle bacilli in large numbers had been mixed. The dogs were killed after three and a half to four hours, the chyle and mesenteric glands removed, and used for the intraperitoneal inoculation of guinea-pigs. Eight of the ten dogs gave positive results, all of these having been inoculated with bovine tuberculosis of the twenty-ninth or thirtieth generation only, while the two negative ones had been given cultures of human tuberculosis of very low virulence—of the one hundred and forty-second generation. Tubercle bacilli were demonstrated microscopically in the chyle and glands from three of the dogs, but none of the ten showed the smallest intestinal lesion. The chyle and mesenteric glands were used to inoculate twenty-four guinea-pigs, and in twenty-one of these tuberculosis was demonstrated by microscopic as well as macroscopic examination.

1. Jour. of Med. Research, vol. v, December, 1903, p. 460.

From these experiments, Ravenel concludes that infection from tuberculous food may take place without a primary intestinal lesion, and that the most favorable condition for such infection is the ingestion of infected foods rich in fats. As the bacilli pass into the chyle and are largely carried into the blood stream through the thoracic duct, it is easy to understand how infection through food may show itself first in the lungs, while the infection of the solitary follicles and mesenteric lymph glands, observed by Dobroklonski, is also easy to explain.

Apparently, therefore, we have experimental proof that, in the lower animals at least, pulmonary tuberculosis may be contracted through the ingestion of milk infected with tubercle bacilli, and that the lesion may be primary in the lungs, the intestines showing no lesions. There is no reason to suppose that the same thing may not be true of human beings also.

SOME FURTHER OBSERVATIONS ON ULTRA-MICROSCOPIC PARTICLES.

Some time ago[1] we commented on a new method for the observation of ultra-microscopic particles. The method was first described by two German physicists, Siedentopf and Ziegmondy. The principle is the lateral illumination of the particles by an intense focus of light. With a microscope particles thus illuminated can be seen as small as 0.005 micron and even smaller. The method was first applied to observe minute particles of gold in a piece of glass. It was suggested at that time that it would be of value in the study of colloidal solutions and also of biologic problems.

Raehlmann[2] has recently reported some interesting applications of this method. In studying solutions of pigments he finds that there are present numerous very minute particles. Particles of different colored pigments not only vary in color, but are also characterized by different form and movement. This fact may be of great service in the dye industry on the analysis of pigments. In a mixture of dyes, the resulting color, in some cases, depends on the formation of new particles whose color, form and movement differ from the particles of either of the original dyes. In other cases, the resulting color depends on the arrangement of the color components, the particles of one color forming an envelope about the particles of the other. This arrangement of particles, he says, appears to be the result of the electromagnetic forces of attraction and repulsion.

These facts are undoubtedly of great importance in the staining of tissues, for we must consider the changes that are brought about by the addition of these particles in the stain to the particles in the cell. The apparent structure may be considerably altered in this way. Then, again, we may study by this method the action of stains on the simple constituents of the cell, such as albumin, carbohydrates, etc. Aqueous solutions of egg albumin, which are homogeneous under the highest power of the ordinary microscope, by the new method show a great number of very minute particles from 5 to 10 microns in size. A very high dilution, 1 to 100,000 or more, is used. All the particles are in rapid continuous vibration, and remain always the same distance apart.

This method can be used for the determination of albumin in urine. Not only its presence is detected, but a quantitative estimation can be made. From the character of particles observed in the urine, even a method for the differential diagnosis of the various forms of nephritis is predicted.

Solutions of carbohydrates, such as gum arabic, dextrin, grape sugar and milk sugar, show innumerable fine particles, which, for the most part, polarize light. Aqueous solutions of diastase show particles about the same size as carbohydrate particles, but differ from them in form and movement. Glycogen is highly interesting. With a dilution of 1 to 3,000,000, sufficient particles can be seen to indicate the presence of glycogen. The particles have a characteristic grayish-white color, and are in extremely rapid vibratory motion, which decreases as the dilution increases. The transformation of glycogen into grape sugar under the influence of diastase can be observed under the microscope. The particles of glycogen disappear, and in their place are seen other particles much fewer in number and having an entirely different appearance.

Such facts as the above can not fail to excite the interests of scientists in general, and especially the physicist, chemist and biologist. Certainly these extremely minute particles must be somewhere near the magnitude of molecules of colloids. At least, a tremendous stride has been taken in that direction. Statements denying the possibility of ever seeing molecules must be reconsidered. Who can say but that ultimately we may not be able to observe the mechanics of a chemical process with the eye? Apparently, an entirely new field has been opened up for many branches of science, and this through the application of extremely simple principles.

1. THE JOURNAL A. M. A., July 11, 1903.
2. Münchener med. Woch., No. 48, December, 1903.

SENSITIZING BACTERIA TO THE FINSEN LIGHT.

In a recent communication,[1] Dreyer of Copenhagen reports certain experiments of therapeutic interest on the bactericidal action of erythrosin—one of the eosin stains—in connection with the Finsen light. He finds that the addition of a very small amount of erythrosin to the culture media of bacteria and infusoria causes a very much greater sensitiveness on their part to the yellow and green rays (which are otherwise comparatively ineffective), and that it acts not only directly on the organisms in the cultures, but through a thick layer of integument as well, in this way destroying the *Bacillus prodigiosus* in twenty minutes. He recommends the use of a one per thousand sterile solution of the Grübler erythrosin in normal salt solution, the in-

1. Dermatologische Zeitschrift, December.

jection to be made according to Schleich's method at the site of the disorder; the Finsen light application fifteen to twenty minutes in well-vascularized, and, for a shorter time, in cicatricial tissue. While his experiments are still too limited to permit of extensive generalizations, they seem to indicate a possibly valuable therapeutic aid in the use of the light rays against microbic infection. The method is so easily put into practice that its usefulness, if it proves as great as seems to be indicated by this communication, will add greatly to the effectiveness of the Finsen method. It would be interesting to test the effect of the *x*-rays on similarly sensitized germs. Dreyer's communication ends with a request to his colleagues to report to him their experiences with this method.

A SOLUTION OF THE RACE PROBLEM.

A Philadelphia professor, it is reported, recently called attention to the fact that in his experience the skin of the negro becomes white under the influence of *x*-rays. We have not mastered the question of the origin of pigmentation in the human or other species, and are, therefore, not surprised at any such development. It would be interesting to know how further experiments in this line will result. An ambitious New Jersey physician, it is said, is taking negro babies at birth, and by the use of the light treatment hopes to be able to affect their future color. We anxiously await the outcome of the attempt on the part of science to solve the race problem.

A RESULT OF CLUB PRACTICE.

The abuses of club practice are rather emphatically shown by a communication in the *British Medical Journal*, January 16, signed "One of the Crushed Doctors." In the community in which the correspondent lives, we are told that a medical man can not even afford a horse, much less leave his practice for a holiday. The amount of medical and surgical work he has to do for nothing is appalling, and if he airs his grievances to the workingman he becomes a monster in that man's sight. Educated people respect the doctor and consider him a gentleman, but the working class, which makes up the larger portion, gives an ignorant nod and familiarly calls the doctor "Jones" or "Smith." If ones tries to collect his bills in court, he receives only the sneers of the crowd and the gibes of the judge for his time, worry, anxiety and loss of sleep, and he has spent 20 shillings to collect 15. He says his experience in this respect has been so bitter that, unless paid at once, he never keeps count of the items, and is happier and better off. The only remedy this crushed doctor sees is in organization in the profession. Physicians must stand together and make their power felt. He says the good money, the easy and spare time, the privileges, the voting power, "the jaunting about, the spending of valuable time and money in betting, gambling, and public houses, the eating and stuffing, the gaudy and expensive dressing, together with the throwing of wholesome food to the rubbish heap," belong to the workingman, not to the doctor in his community. Altogether, it would seem that this "crushed doctor" must be living in a pretty hard community. We have not the evil of club practice in this country to the extent that this contributor indicates, but we may have it if we are not more watchful than we are at present. There are thousands of physicians in this country who are working for an income less than that which the average skilled laborer now receives, and with little prospect of improvement. Shall we permit ourselves to fix this condition for a still larger number of our profession by passively permitting club practice to be established among us?

PHYSICIANS AS DETECTIVES FOR THE POLICE.

In Birmingham, England, the members of the medical profession have taken considerable exception to a circular sent out by the chief constable of that city, calling attention to the murder of a new-born child, and asking information from any physician who had attended a woman who might have been the mother. The physicians object to being made detectives. In the London *Lancet* we note the Birmingham coroner's statement as follows:

> There is a common law liability—a liability that is not specifically set down by act of parliament—under which it becomes the duty of a man, doctors included, to inform the authorities if he believes that a crime has been committed. But, of course, he can always please himself whether or not he does inform them. If he does not, then you have to prove that he has wilfully disregarded his obligation, and that, I can imagine, would not always be an easy matter.

In this connection it is of interest to note that a similar discussion has been taking place recently in this country as the result of the situation in which a certain physician found himself, and concerning which he asked for advice. He was morally certain that a new-born, illegitimate child—at whose birth he officiated—had been strangled, and he was at a loss whether he should inform the authorities, and whether, if he did not inform them, he would be a party to the crime. The opinions expressed were varied, some urging the physician's responsibility to the law and saying that he should not allow crime to go unpunished; others saying that he had no right to violate the confidence that a patient had shown in him by calling him in such a case. Attention was called to the physician's duty to the community. Without discussing the broad subject of privileged communication, perhaps it is fair to say that the physician's attitude should be this: There is no conflict between the law as regards the concealment of crime, on the one hand, and the duty to the patient, on the other. The physician is not a detective; therefore, he should preserve the confidence of his patient while there is any doubt as to a murder, but if he is certain that he has a murderer for a patient the officers of the law should be informed.

THE CAUSE OF EPILEPTIC CONVULSIONS.

Various theories have been advanced to explain the occurrence of an epileptic seizure, but none of these is entirely satisfactory. It has been supposed that there is a slight chemical change in the gray matter of the cerebral cortex, rendering it very unstable. If, now, the gray matter holds in store a large amount of nerve energy, an epileptic fit may be caused

by a sudden and violent discharge of this nerve energy, either with or without a stimulus. Another recent theory is that advanced by Krainski. He found that the output of urea is greatly diminished for a day or more before the occurrence of a fit. In this disturbed metabolism the system is supposed to form ammonium carbonate instead of urea. This compound gives off ammonia, and Krainski believes that the epileptic fits are caused by the ammonia, but this view is contradicted by other authorities. We are, therefore, still very much in the dark concerning the nature of this disease, but it seems that much new light may be thrown on it by experiments. This has recently been attempted, and the results reported are both interesting and encouraging. Mott and Halliburton showed several years ago that the blood, and especially the cerebrospinal fluid of patients suffering from degenerative diseases of the central nervous system, such as epilepsy, combined sclerosis, disseminated sclerosis, etc., contain considerable quantities of cholin ($C_5H_{15}NO_2$). This substance, which is of the nature of an alkaloid, is believed to be split off from lecithin, which in turn is derived from the medullary sheath of the nerve fibers during the process of degeneration. Donath[1] has repeated and verified Mott and Halliburton's observation and came to the conclusion that cholin may be responsible for the convulsions of epilepsy. He examined for cholin the cerebrospinal fluid of 18 cases of idiopathic epilepsy, with 15 positive results; of 3 cases of Jacksonian epilepsy, with 3 positive results, and of many cases of locomotor ataxia, paralytic dementia, brain syphilis and brain tumor, with positive results in nearly 90 per cent. of the cases. By injecting a solution of cholin into the cerebral cortex of animals he was able to produce both localized and general convulsions, which sometimes ended in paresis of groups of muscles. No such convulsions were caused by the injection of salt solution of various concentrations. It would seem, therefore, that epilepsy may be a kind of auto-intoxication, and that the convulsions are caused by a definite chemical substance which is formed in the central nervous system by the degeneration of some of the nerve elements.

1. Zeitschr. f. Physiol. Chemie, xxxix, 526.

DANGEROUS WOOD ALCOHOL.

The dangers of wood alcohol have been pointed out for several years, but the public seems to have but little knowledge of them. Four negroes died in Chicago a few days ago from drinking wood alcohol which was sold to them under the general name of alcohol. We know of no such wholesale instance of methyl alcohol poisoning before, but it furnishes a striking example of the perils that exist in its substitution in various agencies which are made up for dietetic and other purposes. These colored men were topers in the last degree, drinking their material pure, each probably taking a considerable quantity, though the amount is not stated in the accounts. The material was furnished by a druggist, who, it seems, ought to be liable under both the state and Federal laws for thus retailing alcohol for drinking purposes. If alcohol is allowed to be sold to anyone it is important that it should be the genuine article and not this poisonous form. The use of wood alcohol is extending in various ways, and it is extremely important that its dangers should be recognized by the laity.

THE PHYSICIAN IN POLITICS.

Our brothers in the medical profession in Colorado are evidently alive to the needs of medical reform in that state and are equally wideawake as to the means of bringing it about. Beside a complete state organization in connection with the Committee on National Legislation of the American Medical Association, with representatives in every county, they have also organized a Colorado Medical Legislation League to secure "the improvement and enforcement of the medical laws of the State of Colorado." This body is non-sectarian, and aims to include all reputable legally qualified physicians who are interested in medical reform and who will devote some of their activities and influence to this end. It is proposed to confront each candidate for office with the question whether he favors or opposes medical reforms. In this way physicians can make their influence felt by politicians who will not dare to disregard the wishes of so influential a body as a united medical profession. The need of such a movement in Colorado is obvious, as in that state the quacks have of late years seemed to have exclusive access to the executive ears, ample as they evidently must have been. If the profession insistently so will it, Colorado can, with the next election, have a governor who will intelligently fill his high office and not annul wholesome medical legislation by vetoes inspired by frauds. With this special education of candidates the league will also carry on a general campaign of education, correcting the erroneous statements that may be given out in the public press and otherwise, and generally educating the public as to the true purposes of the organization. The example is a good one, and it would be well if similar efforts were made in every state.

THE COST OF PRODUCTION OF DIPHTHERIA ANTITOXIN.

So many statements have been made in the public press during the last few weeks regarding the cost of producing diphtheria antitoxin that it is interesting to turn to the itemized statement published by the State Board of Health of Massachusetts in the thirty-fourth annual report which has just reached us. It appears from this that the expenditures at the pathologic laboratory at Forest Hills, where the diphtheria antitoxin is prepared under the direction of Prof. Theobald Smith, amounted during the year ending Sept. 30, 1902, to $6,562.14. This includes the salaries of assistants and attendants, the purchase of animals, the board of the horses, and the apparatus, chemicals and laboratory supplies, together with a variety of incidental expenses. During the year ending March 31, 1902, 40,211 bottles, and in the year ending March 31, 1903, 33,475 bottles were issued, each bottle containing 1,500 units. This would amount to an average production of 55,264,500 units annually. It is to be presumed that the salary of the director, as well as the expense of distribution,

together with depreciation and interest charges on the plant, are not included in the figure given above, which, we understand, is simply the running expense account. As a partial offset to this, however, it may be mentioned that certain examinations of diphtheritic and tuberculous material are made at the Forest Hills laboratory, the cost of which is apparently not separated from that of the antitoxin production. Assuming that the whole amount legitimately chargeable to the cost of producing diphtheria antitoxin was not more than $15,000, which, considering the items included in the statement cited, seem a very liberal estimate, the cost per 1,000 units would not be more than 28 cents. In view of the figures printed in THE JOURNAL, January 23, this would seem to indicate that the price of $1.33 per 1,000 units recently established by the manufacturers, affords a margin larger than would be deemed absolutely necessary to the profitable and successful conduct of ordinary commercial undertakings.

Medical News.

ALABAMA.

Will Enforce Law.—Twelve physicians have been appointed by Dr. Charles Whelan, Jr., city physician of Birmingham, to carry out the law, which provides that all persons shall be vaccinated who can not show signs of successful vaccination during the last seven years.

Personal.—Dr. Claude L. Murphee, Gadsden, has been elected health officer of Etowah County.——Dr. George A. Ketchum has been re-elected chairman, and Dr. Vivian P. Gaines, secretary, of the board of censors, of the Mobile Board of Health. ——Dr. Ulysses G. Mason has resigned as assistant city physician of Birmingham.

Smallpox.—All public gatherings at Sheffield have been prohibited in Sheffield, which has at present 15 cases.——Florence has quarantined against Sheffield.——Altoona has 4 cases.—— Jefferson County Medical Society, on account of the prevalence of smallpox in the county, urges compulsory vaccination.—— Cordova is rumored to have about 250 cases.——Several cases have developed in Tuscumbia, and compulsory vaccination of all school children has been ordered.

COLORADO.

Jury Disagreed.—In the suit brought by Edward O'Donnell against Dr. Daniel R. Lucy, Denver, for alleged malpractice, in which the plaintiff claimed $10,000 damages, the jury failed to agree, and was discharged.

December Deaths.—During December 800 deaths were reported in the state, equivalent to an annual mortality of 16.38 per 1,000. Of these 23 were due to typhoid fever, 20 to diphtheria, and 16 to scarlet fever.

Typhoid Epidemic in Leadville.—Leadville has had about 500 cases of typhoid fever; the State Board of Health has cooperated with the local authorities, and it is now believed that the situation is well in hand. The chief work now being done is in the direction of tracing the infection to its source.

Communicable Diseases.—There were reported to the State Board of Health, during December, 200 cases of scarlet fever, 121 cases of diphtheria, 100 cases of smallpox and 77 cases of typhoid fever. Compared with the previous month this shows an increase of 21 cases of diphtheria, 49 cases of scarlet fever, and 40 cases of smallpox, and a decrease of 244 cases of typhoid fever.

Boulder County Medical Society.—This society held its annual meeting in Boulder, January 7, and elected the following officers: President, Dr. Walter W. Reed; vice-president, Dr. William J. Baird; secretary, Dr. Oscar M. Gilbert; treasurer, Dr. Martin E. Miles; censors, Drs. George H. Cattermole, Horace O. Dodge, and William J. Baird, and delegate to state society, Dr. George H. Cattermole, all of Boulder.

CONNECTICUT.

Infectious Diseases.—Two cases of smallpox were reported during December, 1,722 cases of measles, 184 cases of scarlet fever, 152 cases of diphtheria, 55 cases of whooping cough, 65 cases of typhoid fever, and 22 cases of consumption.

Unlicensed Practitioners Fined.—J. Lewis Sweet, Milford, and Eugene J. Higgins, New Haven, charged with prescribing drugs for pay without a physician's license from the state, were each fined $100 and costs, the minimum sentence under the law.

December Mortality.—During December there were 1,322 deaths in the state, equivalent to an annual mortality rate of 17 per 1,000. There were 151 more deaths than in the month preceding, 24 more than in December, 1902, and 128 more than the average for December of the last 5 years. Infectious diseases caused 18.3 per cent. of the mortality.

Temperance, Physiology and Hygiene.—The Connecticut State Board of Education has sent out a pamphlet to teachers, with suggestions as to teaching temperance, physiology and hygiene. The objections advanced to alcohol as a drink are that it injures the cells of the body, weakens the muscles, harms mind and morals, decreases resistance power, predisposes to disease, and tobacco is arraigned because it retards growth, dulls intellectual power, may produce serious nervous disturbances, and interfere with digestion and predisposes to diseases of the throat and heart.

ILLINOIS.

Personal.—Dr. Llewellyn B. Ashton, assistant surgeon at the Soldiers' Home, Quincy, has resigned.——Dr. Martin Cushing has been appointed local surgeon of the Chicago and Alton Railway at Joliet, vice Dr. James A. Clyne.

Normal and Not Bloomington Has Smallpox.—An item in THE JOURNAL of last week was incorrect in that it stated that schools and churches in Bloomington were closed indefinitely on account of smallpox. Normal, which adjoins Bloomington, is the infected town, and Bloomington has at present only one case of smallpox.

Eminent Chemist Dead.—Prof. Arthur W. Palmer, head of the department of chemistry in the University of Illinois, Champaign, who had made a national reputation by his research work for the last nine years on the Illinois water survey, died at his home in Champaign, February 3, after a short illness, aged 33.

Prevention and Suppression of Typhoid.—The Illinois State Board of Health has prepared rules and regulations concerning the prevention and suppression of typhoid fever. These were formally adopted by the board at the annual meeting. Copies of these rules have been sent to all newspapers in the state and to every county, township, village and city health officer, and they will also be distributed among the people by the local health officers.

Chicago.

Personal.—Dr. Ludvig Hektoen is expected to deliver an address before the Minneapolis Pathological Society February 15. The Hennepin County Medical Society and the Minneapolis Medical Club have been invited to be present.

Addition to Hospital.—The directors and medical board of Presbyterian Hospital have under consideration plans for the construction of additions to the institution, including a surgical pavilion and a new out-patient dispensary for the poor. Part of the $500,000 required for these additions has already been pledged.

January Deaths.—The total deaths for the month were 2,361, or an annual rate of 1,424 per 1,000. In January, 1903, 2,573 died, and in December, 1903, 2,354. The principal death-causes were pneumonia, 504; consumption, 248; heart diseases, 205; Bright's disease, 156; violence, 141 (not including deaths from Iroquois Theater fire), and bronchitis, 123.

Deaths of the Week.—The total deaths for the week ended February 6 were 596, equivalent to an annual death-rate of 15.92 per 1,000; exactly the same number as in the corresponding week of 1903. Pneumonia still maintains its lead with 151, consumption following with 54, and Bright's disease and heart disease coming next with 48 and 45 respectively.

Popular Lectures.—Under the auspices of the School of Domestic Arts and Sciences, the following arrangements for lectures have been made: Dr. Walter S. Christopher, "Care and Diet of Children"; Dr. John B. Murphy, "The Significance of Timely Action in Acute Surgical Diseases"; Dr. Harry B. Favill, "Food Requirements"; Dr. E. Fletcher Ingals, "Colds," and Dr. James B. Herrick, "Self-Limitations of Certain Diseases."

The Pasteur Institute's Work.—Dr. Antonio Lagorio, director of the Pasteur Institute, reports that since the institute was

opened, July 2, 1890, 2,026 patients have received the anti-hydrophobic treatment. Of these 1,807 had been bitten by dogs, 76 by horses, 57 by cats, 19 by cows, 18 by skunks, 25 by other animals, and 22 were infected by hydrophobic human beings. Of individuals bitten by animals absolutely known to have been rabid, 982 were treated; of patients bitten by animals presumed to have been rabid because of symptoms of disease during life, 776 were treated, while 268 cases were cared for in which rabies was suspected. Only 7 deaths are reported, a mortality of 0.34 per cent. Six individuals abandoned treatment, 2 of whom subsequently died from hydrophobia.

INDIANA.

Hospital Opens.—The Flower Mission Hospital for Incurables, Indianapolis, was opened for patients, January 27.

Nurses Meet.—A meeting of the Indiana State Nurses' Association will be held at the Grand Hotel, Indianapolis, February 22.

All Physicians Members.—The Vanderburg County Medical Society held its regular meeting, January 10, at the offices of Drs. Walker Welborn, Evansville, it being the tenth anniversary of the opening of the Evansville Sanitarium. This society, three years ago, took into its membership all sectarians, and now practically every physician in the county is on its roll. The result has been entirely satisfactory. Evansville was the first city to take so sweeping an action.

Vital Statistics of Indianapolis.—During January, 1,004 cases of measles were reported. In January, 1903, 261 cases of smallpox were reported, and only 2 in January, 1904. Typhoid fever had 50 victims in January, 1903, and only 7 cases in January of this year. A similar reduction was observed as regarded diphtheria and scarlet fever. During 1903, 3,004 deaths occurred, a death-rate of 15.02 per 1,000. Tuberculosis caused 353 deaths; pneumonia, 185; smallpox, 96; typhoid fever, 93, and diphtheria, 35.

Sickness and Death in December.—Measles was reported from all parts of the state in December. There were 9 deaths, and at least 10,000 cases. Tonsillitis was second in prevalence, many of the cases, no doubt, being diphtheria. Pneumonia was third in prevalence, then rheumatism, bronchitis, influenza, smallpox, scarlet fever, typhoid fever, diphtheria and diarrhea in the order named. Of smallpox 523 cases, with 2 deaths, were reported. In the corresponding month of last year 642 cases were reported, with 17 deaths. Almost one half of the cases were reported from Clay County. The first marked epidemic of smallpox occurred in that county four years ago, and despite many deaths and a great number of severe cases, it has been impossible to secure general vaccination. The deaths from tuberculosis numbered 371, a rate of 173.9 per 100,000. In the same month of 1902, the deaths numbered 319, rate 149.5. Typhoid fever caused 65 deaths. In the same month last year 91 deaths were reported. There were 701 cases in all. Pneumonia caused 392 deaths, a rate of 183.8 per 100,000. In the same month last year 267 deaths were reported, a rate of 125.1. By other causes than the above, the deaths were: diphtheria, 54; scarlet fever, 34; diarrheal diseases, 23; cerebrospinal meningitis, 34; influenza, 35; puerperal fever, 10; cancer, 91, and violence 153.

MARYLAND.

Diphtheria and Smallpox.—Seven cases of diphtheria have occurred in one family in Baltimore County.——The smallpox situation in Garret County was said to be improving January 31.

Want General Hospital.—A public meeting was held at Hagerstown, February 2, for the establishment of a general hospital there for Washington County. The movement originated with the county medical society. A committee was appointed to get charter and necessary legislation, including an appropriation from the legislature.

Baltimore.

Vital Statistics Fees.—An ordinance proposed in the city council for paying physicians $1 for registering deaths and births has been indefinitely postponed.

Personal.—Dr. Nathaniel G. Keirle, Jr., has returned from Paris. He will take charge of the laboratory of the Pasteur Institute of the College of Physicians and Surgeons.

Crusade Against Spitting.—One effect of the Tuberculosis Exposition is that the city health department has started a crusade against spitting in street cars, public buildings, etc. Much comment has been caused by the refusal of a magistrate to enforce the law on the subject.

January Disease and Death.—The report for January shows 959 deaths and 674 births. The health department has not succeeded in having all the latter reported as yet, whereas no one can be buried without a permit. Diphtheria, tuberculosis, scarlet fever and typhoid were more prevalent than last year, while influenza and pneumonia showed a much reduced mortality and measles was not represented.

The Baltimore Fire.—The great fire of Feb. 7 and 8, 1904, which burned over twenty-four squares of the business center of Baltimore, entailing a loss of over $100,000,000, but which was marked by exceedingly few fatalities, burned the office of the State Board of Health. The offices of the *Maryland Medical Journal* escaped, as did Johns Hopkins Medical School and Hospital, although the latter were within a few blocks of the fire.

Tuberculosis Exposition Closed.—The Tuberculosis Exposition closed February 1. The legislature was invited to inspect it on that day, but only two members came. Dr. William Osler gave an address at 10 a. m. on the "Literature of Tuberculosis," using the collection which had been made for the exposition. The disease has always been known, but Hippocrates confounded it with other affections causing extreme emaciation. He made five periods of the history of tuberculosis: 1, from Hippocrates to seventeenth century, Morton of England and Sylvius of Holland; 2, from the latter to 1810, Bedard; 3, from the last to 1819, Laennec; 4, from Laennec to 1882, Koch, and 5, since Koch. A great crowd attended this final lecture of the series.

Dispensary Report.—The Northeastern Dispensary makes the following report for 1903: New patients, 7,250; total visits, 15,798; visits in general medicine, 5,853; in eye department, 2,353; in ear department, 294; in gynecological department, 1,050; in surgical department, 1,714; in children's department, 3,534; in skin department, 892; in dental department, 710; in obstetrical department, 13; operations in eye department, 221; operations in ear department, 85; operations in nose and throat department, 10; operations in surgical department, 117; operations in gynecological department, 543; patients visited at their homes, 230; visits made to the homes, 1,032; prescriptions filled in dispensary, 21,385; prescriptions filled for outside physicians, 905. Dr. Arthur Wegefarth was re-elected president of the board and Dr. Alexander D. McConachie, secretary. The following changes in the staff were made: Dr. Louise Erich was placed in charge of the orthopedic department; Dr. Ernest Lehnert was made assistant in surgery and gynecology; Dr. A. G. Singewald was appointed to the children's department, and Dr. P. E. Lilly was made chief of the outdoor clinic.

MASSACHUSETTS.

Senate Refuses Antitoxin Grant.—The senate has refused to grant to the State Board of Health the $1,500 necessary to produce the antitoxin and vaccine virus which they are directed by last year's legislation to furnish free to the physicians of the state.

Object to Removal of Ice by Salt.—The Boston Board of Health has warned people, especially the street railway employes, that salt must not be used so freely in getting rid of ice and snow. Much complaint has arisen because pedestrians have been obliged so often to wade in a freezing mixture of snow, water and salt, resulting in serious risk to health.

Would Abolish Unpaid Commissioners.—Out of the investigation of pauper institutions at Long Island last summer, when the board of unpaid commissioners was criticised because the City Chronic Hospital was so well conducted, has come a bill to the legislature, abolishing the board and substituting one paid commissioner. The bill was approved by Mayor Collins' legal representative, and is not likely to be favorably reported.

Newton Hospital Report.—The reports presented at the annual meeting of the Newton Hospital Corporation showed assets of $216,079; endowment, $74,087; contributions from the churches of the city, $10,805, and earnings, $24,485, an increase of $2,000 over 1902. Current expenses were $36,049, $2,500 less than in 1902; 814 patients received treatment, the average cost in the wards being $14.00 per week, and in the contagious wards, $20.00 per week. A new maternity ward is urgently needed. The vote abolishing the office of superintendent virtually removed Dr. Francis G. Curtis, who for six years has served without pay. Dr. J. R. Phelps, Malden, is the newly elected house officer in charge.

NEW YORK.

New York City.

Munificent Gifts.—Miss Emily A. Watson has given $100,000 to the New York Orthopedic Dispensary and Hospital, to establish a branch of the institution at White Plains; she has also agreed to endow this branch with a fund of $250,000.

Midwives Prescribed.—Five of the six midwives in the Bronx charged with practicing medicine without a license pleaded guilty, January 25, and were each fined $50. The New York County Medical Society preferred charges in these cases.

Norwegian Hospital Open.—The new Norwegian Hospital, Brooklyn, is almost ready to receive patients. It was opened, February 1, with a fair, which continued all the week. The institution will accommodate 100 patients and will represent an outlay of about $150,000.

Attendants Exonerated.—The charges brought against certain nurses in the Manhattan State Hospital, Ward's Island, by Miss Ellen Isibel Farley, after having been thoroughly investigated by the State Commission in Lunacy, have been declared without foundation, and have been dismissed.

OHIO.

Osteopath Fined for Not Reporting Diphtheria. Joseph A. Vance, president of the Ohio College of Osteopathy, Chillicothe, was fined $20 and costs, February 2, for failing to report a case of diphtheria to the proper health officials.

Typhoid in Columbus.—During January 723 cases of typhoid fever were reported in Columbus, with 23 deaths. On January 31 the highest record of new cases was made, with 81. The mayor has appointed a joint commission from the local board of health, a committee from the Columbus Academy of Medicine, and the sanitary committee of the board of trade, to investigate and report on the causes of the epidemic.

Vital Statistics of Dayton.—The report of the board of health for the year 1903 shows a total of 1,928 births, or 20.29 per 1,000 of population. At least one birth in ten, it is thought, was not reported. The number of deaths for the same period was 1,198, or 1,261 per 1,000 of population. The report also shows that 110 cases of smallpox developed in the city during 1903, costing an average of $136 per patient. The department vaccinated 6,500 free of charge, and this wholesale vaccination put an end to the epidemic.

Cincinnati.

District Physicians.—Dr. J. W. Hall has been appointed district physician to the eighth ward, vice Dr. C. W. Dane, resigned, and Dr. Frank C. King, in the fourth ward, vice Dr. J. T. McKibben, resigned.

Christ's Hospital Reopened.—Christ's Hospital, closed for repairs July 1, 1903, was reopened to patients February 1. The repairs practically amounted to a remodeling, and have cost more than $60,000. The hospital now has accommodations for 100 patients, and in addition there is an outside building which will accommodate about 45 deaconess nurses.

Peculiar Situation at Hospital.—A peculiar condition of affairs exists at the Cincinnati Hospital. The annual appropriation has been so small and the number of patients so large that gradually the hospital has been getting deeper into debt, until now it owes about $30,000. The hospital now contains 120 more patients than it really has room for, and they are sleeping in the end-rooms, on the floor and wherever an additional cot can be squeezed in. The reason of this overcrowding is the measles and typhoid epidemics, and to this fact the attention of the board of public service has recently been called. According to the law, the $50,000 bond issue asked for can be allowed only by an election, which would cost the city $20,000, or it must be shown that there is some extraordinary need, as, for instance, an epidemic. The medical directors of the Cincinnati Hospital then reported to the board of public service that there is an epidemic both of measles and typhoid fever in the city. Following this advice the board immediately authorized a $50,000 bond issue for emergency hospital purposes. Before the bonds can be issued, however, the ruling must pass the council, but no difficulty is anticipated here, as press and public are heartily in favor of the movement.

TENNESSEE.

Anti-Vaccinationists Arraigned.—The health officer of Knoxville has sworn out 18 warrants for individuals who have refused to be vaccinated as prescribed by the city ordinance.

Smallpox.—Lowerville reports 7 cases, with no deaths.——Several prisoners in the Jacksboro jail are suffering from smallpox, and the jail is under strict quarantine.——On February 1 there were 280 people in the Knoxville detention camp and isolation hospital. The situation has greatly improved.

Dr. Happel's Illness Not Severe.—It was reported that Dr. T. J. Happel, Trenton, had suffered a stroke of apoplexy. We are happy to state that the only foundation for the rumors was the fact that, while eating, Dr. Happel suffered from a spasm of the glottis, followed by fainting. He recovered in an hour.

GENERAL.

The Ingersoll Lecture at Harvard University this year will be given by Dr. William Osler, on "Science and Immortality."

The Association of American Universities, at its meeting at Yale, February 18-20, will discuss the actual and the proper lines of distinction between college and university work, uniformity of university work, the administration of publications and their circulation, and whether the bachelor degrees in science and letters are to be preserved or are to be merged in the degree of bachelor of arts.

Examinations for Army Medical Service.—The examination of applicants for appointment as assistant surgeon in the United States Army will be resumed in Washington immediately after the close of the present session of the Army Medical School; it will embrace the full examination (as heretofore), at the conclusion of which those found qualified will be commissioned. Full information as to the requisite qualifications, nature of examination, etc., may be obtained from the Surgeon-General of the U. S. Army, Washington, D. C. The examining board will probably reassemble about the middle of April, and applicants should make application at once. Applicants are restricted in age to thirty years, and one year's hospital experience or its equivalent in private practice is required.

CANADA.

Protestant Hospital for Insane, Quebec.—At the annual meeting in Montreal last week, voluntary commitment was discussed; the medical superintendent, Dr. Burgess, had been solicited by people who believed they would be mentally benefited by treatment in the institution. The law forbids this form of commitment. The matter will be brought to the attention of the provincial government. The admissions for 1903 were 152; number under treatment, 581; discharged as recovered, 57; as improved, 23; deaths, 44.

Ontario Teachers To Be Trained in Hygiene.—A medical conference was held last week in Toronto, as the first step in an investigation of school hygiene by the Ontario Board of Health. One result of the conference may be a medical section in connection with the annual conference of the Ontario Teachers' Association. Papers were read on the prevention of infectious diseases, and Dr. C. A. Hodgetts, secretary of the Ontario Board of Health, advocated compulsory drill for school boys, as the basis for men trained for the militia.

Personal.—Dr. A. J. Richer, secretary of the Montreal League for the Prevention and Cure of Tuberculosis, has returned from a four weeks' visit to the United States, where he studied tuberculosis organizations and methods.—Dr. A. D. Decelles, general librarian of the parliamentary library at Ottawa, who was created by the government of France a chevalier of the Legon of Honor last October, for his work in connection with literature, was presented by his friends with a beautifully wrought address and a massive silver inkstand, last week, the presentation being made by Dr. Prevost of Ottawa.

Unusual Mortality in Toronto in January.—For the first time in the history of the city, so far as the records show, deaths for January numbered 412, an excess of seventy over January, 1903. Sixty-five cases of pneumonia died, and 178 persons died who were over 50 years of age. Of these six were over 90 years, 31 over 80, 39 over 70, 61 over 60 and 41 over 50. There were 26 deaths from tuberculosis and 21 from diphtheria. During the month there were 415 births. The city was remarkably immune from typhoid fever, only 2 cases being reported. This showing indicates the purity of Toronto's water supply; it has been asserted that it is the purest in America.

FOREIGN.

Liverpool University's new chair in dermatology is the gift of Dr. Stopford Taylor.

Tenth Quadrennial Congress of Polish Physicians and Scientists.—This will be held in Lemberg, Austria, July 20-24.

1904. Dr. Francis E. Fronczak, 508 Fillmore Avenue, Buffalo, N. Y., is the United States representative of the committee of arrangements.

Isolation of Consumptives in Hospitals.—The Paris Société des Hôpitaux recently voted a resolution urging the authorities to insist on the isolation of all cases of "open tuberculosis." In order to have it attended to at once they advocate placing in the general wards in the hospitals glass partitions to wall off a certain part of the ward to be allotted to this class of patients entirely. This will reduce the danger of contagion for the other patients, while not adding to the tasks of the attendants or increasing the difficulty of supervision of the ward.

DUBLIN LETTER.

Deaths in the Profession of Dublin.

During the past year death dealt unusually harshly with the medical profession in Dublin. Only a few months ago two colleagues at the Royal City of Dublin Hospital, Sir George Duffey and Mr. H. G. Croly, past presidents of the royal colleges of physicians and surgeons, respectively, passed away within a few weeks of each other. On Christmas day a veteran of Dublin practice followed them, Dr. C. F. Moore, who had been for many years certifying surgeon under the factory acts, and had nearly reached his ninetieth year. With the new year Trinity College lost two distinguished graduates —one of her oldest and one of her youngest in the service of the king. Sir William Kynsey had entered the Army Medical Service in 1863, and after serving in the Ashantee war was appointed to an important government post in Ceylon, which he held till a few years ago. Lieut. Joseph Welland had entered the Royal Army Medical Corps in 1900, and now in his second campaign in Somaliland has been speared in battle while in discharge of his duty. As a Dublin student he was a well-known oarsman, and some of your readers will learn with regretful interest that he stroked the Dublin crew in the famous contest with the Pennsylvania crew at Killarney in 1901.

The Poor Law Medical Service.

The one subject of interest to the profession in Ireland at present is the position of the medical officer in the Poor Law Medical Service. Though to all Irishmen, at home or abroad, the "dispensary doctor" is as familiar a figure as the parish priest, and his position as well defined, yet it may be well, in a few words, to explain his position and duties. It is the custom for the local elective boards, the boards of guardians, to appoint in each district throughout the whole country, a medical man whose duty it is, at a fixed salary, to attend all the poor of the district. There is no definition of "poor person," and to be entitled to free medical treatment, all that is necessary is the possession of a ticket signed by a member of the board of guardians. When it is remembered that many of the guardians are small shopkeepers and village publicans, it is obvious that abuse of the issue of tickets is easy. In pursuance of his duty the dispensary physician has to attend on fixed days, two, three, or more in the week, at appointed stations in his district and give the necessary treatment to those who present themselves. In addition, he has to hold himself in readiness to attend patients at his own house at any time, and should he receive a "visiting ticket" he must at once, whether by day or night, proceed to visit the patient. He is not allowed to leave his district, even for an hour, without permission from the guardians. The salaries paid to the medical officers vary from £30 to about £150 a year (about $150 to $750), but, of course, private practice is allowed, so long as it does not interfere with public duties. The districts vary greatly in size, some being only four or five miles in diameter, and others up to thirty or forty. In many parts of the country almost the whole population come under the title of "poor persons," and obtain gratuitous medical relief, it not being an unusual thing for a guardian to issue tickets to his own immediate relatives. It will be easily seen that under such circumstances the emoluments from private practice are inconsiderable. Under the most favorable conditions, except in some of the more prosperous country towns, the position of the dispensary physician is an unenviable one. He is the servant of a board composed of men who are for the most part his inferiors in education and social position. He has no time of leisure; night and day he is at the beck and call of the public. His salary is small, and out of it he must keep one or two horses and a trap. In addition to his strictly medical duties, he is in nearly every case his own dispenser. He has no right to any annual holiday, and if with difficulty he obtains it, he usually has to pay his substitute, at least in part. There is no satisfactory arrangement for superannuation, and after forty years' service, when old age and ill health make retirement a necessity, a pension may be refused. Again, the election of the medical officer being in the hands of a popular and often ignorant board, who are quite incapable of judging the qualifications or professional merits of the candidates, the appointment is made on other grounds than desert. Family influence, religious and political considerations carry the day. In some cases, indeed, the advertisement for a medical office demands that he must be a member of a certain political organization. At the present time firm stand is being made by the profession in Ireland, and the Irish Medical Association, the strongest representative body of medical men in the country, has adopted a certain program of what it considers the minimum of necessary reform. The points insisted on are, in brief, higher salaries, with a minimum of £200 a year, a monthly holiday of four weeks, and proper pension arrangements. Many of the more ardent reformers, however, go much further, and, in particular, Dr. Kidd of Enniskillen urges that the whole medical work of the poor law service should pass into the hands of the state, to be managed on lines similar to the navy and army medical services. Other medical men differ widely on this point, and quite recently Dr. McArdle, a well-known surgeon in Dublin, has had a tilt at Dr. Kidd in the daily press. There are present many dispensary appointments vacant all over the country, it being impossible to attract candidates at the salaries offered.

The Tuberculosis Prophylaxis Campaign.

The most serious problem of public health in Ireland at present is the question of tuberculosis. While in England and Scotland during the last forty years the death rate from tubercular diseases has diminished by nearly a half, the rate in Ireland is practically stationary. This, in itself, is very discouraging, but when it is remembered that the population in Ireland is mainly agricultural, and in England industrial, it is even worse, since the agricultural life is certainly the more hygienic. Vigorous attempts are being made on all sides to instruct the people in the proper measures to adopt to prevent tuberculosis, and the Roman Catholic priesthood has taken the matter up very warmly, and the bishops have arranged for lectures in hygiene to be given at the College at Maynooth. The National Board of Education, in like manner, is giving instruction to the primary teachers, whose influence reaches very far. The present accommodation in Dublin for the treatment of consumption is still far from adequate. Institutions of two kinds are needed, for the isolation and care of incurable patients, and for the treatment and cure of early cases. There are, of course, institutions of both kinds doing excellent work as far as their resources allow, but they are on too small a scale and hampered by lack of funds. The danger to the public from tuberculosis is of the gravest nature, and demands public action of a comprehensive kind.

A case of typhoid fever, very interesting on the pathologic side, has just been published by Dr. H. C. Drury, a Dublin physician. The patient, a young man of 21, recovered from an attack of typhoid, perforation having taken place and operation performed in consequence. Twenty-one days after the temperature had become normal acute obstruction of the bowels occurred, and, in spite of operation, the patient died. The obstruction was due to extensive peritoneal adhesions, but the state of the interior of the bowel was the most interesting point. Here was found an enormous number of ulcers still unhealed, three weeks after the temperature was normal, during a fortnight of which time solid food was being given.

LONDON LETTER.

The Profession in 1904.

The Medical Directory for 1904 shows that there are 37,730 registered practitioners—an increase of 439 on the number for 1903. It is satisfactory to chronicle that in the overcrowded state of the profession the annual addition tends to decrease. Thus in 1894 the addition was 1,013; in 1895, 818; in 1896, 730; in 1898, 713; in 1899, 619; in 1900, 534, and in 1903, 503.

Royal Army Medical College and Hospital.

A new military hospital has for some years been building on the Thames Embankment, and is now nearly complete. It will be the military hospital for the London garrison. There will be 225 beds, of which 150 will be assigned for ordinary purposes, excluding venereal diseases, and 75 will be reserved in clinical wards for special cases. The professors of military surgery and tropical medicine of the Royal Army Medical College will be in charge of the surgical and medical divisions re-

spectively, and will give clinical instruction to the medical officers attending the college. They will be assisted by officers who will perform duties similar to those of house officers in civil hospitals. Near the hospital will be built the Royal Army Medical College, which will contain class rooms and laboratory accommodation for pathology and bacteriology. These arrangements are part of the outcome of the radical reform of the army medical department, which resulted from the sensation produced by the so-called "hospital scandals" of the Boer War.

State Registration of Trained Nurses.

The Royal British Nurses' Association is promoting a bill for the state registration of trained nurses. A central board is proposed of physicians and nurses appointed by medical and nursing organizations. At first two years' training in an institution recognized by the central board will be required, later three years' training and the attainment of the age of 24.

The Naval Medical Service.

In recent years important changes have been made in the naval medical service with a view to secure increased efficiency. A consultative board has been introduced, consisting of three civilian physicians of eminence and two naval medical officers to bring the navy into touch with the medical profession outside the service and to introduce improvements in hospitals, both on shore and afloat. Special instruction of medical officers in the diseases of foreign stations with special wards for the study of such diseases has been established at Haslar. An institutional officer versed in these diseases has been placed in charge with an allowance of $750 per annum in addition to his ordinary pay and residence. Prizes for excellent work, a gold medal, a microscope, a silver medal, and books will be awarded to surgeons under instruction on the termination of the half-yearly sessions. The number of medical officers attending graduate instruction has been much increased, and such instruction is applicable not only to surgeons as formerly, but also to staff-surgeons and fleet-surgeons. A complete outfit of surgical instruments is supplied to all ships; the surgeon is now required to provide only a pocket case. The examinations have been remodeled. The examination for the promotion of surgeons to the rank of staff-surgeon will be conducted by the civil medical examining board with a naval medical officer for the examination in naval hygiene. Greater facilities and inducements are offered to the house officers of the large civil hospitals to enter the navy. Those who on entry hold, or are about to hold, such appointments, are allowed to serve on in that appointment up to one year, reckoning the time served for increase of their pay. Earlier promotion to the rank of staff-surgeon is also granted to these surgeons, and one year's seniority may be so gained. The period of service required of surgeons before undergoing examination for promotion has been reduced from eight to five years. The pay has been increased. Formerly a surgeon received $1,000 a year on entry, and an inspector-general $5,000, with quarters; the former now receives $1,250 and the latter $6,500. The regulations as to withdrawal from the service have been extended, and a surgeon may now be allowed to withdraw after four years' service, with a gratuity of $1,250, on condition of joining a reserve for service, in case of war or emergency, for a period not exceeding eight years.

The National Hospital for the Paralyzed and Epileptic.

An appeal is being made for funds to prosecute researches into the origin of nervous diseases at this world-famous hospital. The object is to make provision for permanent and systematic pathologic work, so that the large available material of the hospital may not be lost to science, as most of it now is. It may be mentioned that investigations made at the hospital last year led to discovery that Landry's paralysis is due to a micrococcus.

Correspondence.

The Birth and Origin of Syphilis.

BALTIMORE, Jan. 28, 1904.

To the Editor:—I was surprised to find in THE JOURNAL, January 9, the following statement by Dr. Knott regarding "The Birth and Origin of Syphilis": "While so much mythologic lore remains connected with the origin of the great epidemic of syphilis which swept Europe at that date (the siege of Naples), it is no matter for surprise that the question of the existence of the disease in ancient times still remains a matter of dispute."

The fact is, venereal diseases embrace all periods of man's existence. It existed long before the Christian era, and all through the period of classical antiquity. It flourished in the free republics of Greece, and under the corrupt sway of the Roman emperors. The scholar should read the Fathers as authorities for the history of venereal disease, for their "Orationes Contra Gentes" especially afford much valuable material toward a knowledge of the moral condition of the nations of antiquity.

It is strange with what pertinacity and universal acceptance stories of the spontaneous birth of syphilis remain in the mind of man. Astruc and Gutanner put forth that childish fiction of the origin of syphilis being in the cohabitation of Columbus' men with the Indian maidens; but they forgot to tell us where the maidens contracted the disease. Hensler made every exertion to dissipate this puerile and unscientific tale, but so strong is the love for the romantic in our nature that his efforts were for a long time fruitless.

P. G. Klein[1] shows from annals of Malabar that long before the discovery of the West Indies venereal disease was known in the East Indies, for the Malabar physicians, Sangarasiar and Alessianambi, who lived more than nine hundred years ago, and other physicians before them, make mention of the disease and its cure by mercury. Dr. Wizman[2] made the disease arise in the second century in Dacia, which at that date was transformed into a Roman colony and had to welcome the licentious Roman soldiery. The excesses of these colonists, in a strange climate, and seconded by a combination of circumstances favorable to epidemic sickness, produced the disease, as he said. Accordingly Wizman, as also Sprengel and Choulant, and, to some extent, Gruner, who considered the Moors to be the parents of the venereal disease, may be regarded as taking up an intermediate position between the two extreme views as were then held, i. e., the disease as a new one and as an ancient affection.

It is impossible in any limited space to give a chronologic account of the Venus cult of the people of antiquity, for it existed everywhere in the east under varying forms and names.[3]

It was at Babylon that the cult of Venus originated as Mylitta worship, spread over the inland parts to Mesopotamia as the Sabean religion, and was passed on by the Phoenicians to the seaboard people as Astarte—worship. During this period filth and lust prevailed, and is the constant complaint of the writers of the day. Juvenal, for instance (Satir 1, 104): *Mesopotameni homines effrenatal libidinis sunt in utroque sexu, ut Salustius meminit*—(The inhabitants of Mesopotamia are people of unbridled lustfulness in either sex, as Sallust records). The worship of Bacchus, and with it the phallic ritual, was transplanted to Greece and India. To explain the occasion of this introduction there is a legend related which certainly gives us an account of genital disease. It is given by Natalis Comes.[4] The author borrowed the legend from Periamder. It is also found in the *Scholiast* to Aristophanes; Acharn. 1: "There were phallic rites, too, established in honor of Dionysus (these were observed among the Athenians; for it was at Athens that the far-famed Pegasus first established the worship of Eleutherian Bacchus), at which men chanted hymns telling how the gods freed the Athenians from a plague, and how he was given of many good gifts to mortals." The story relates that Pegasus brought the images of Dionysus from Eleutheria, a city of Boeotia, to the land of Attica; but the Athenians slighted the god, and did not, as was their wont, receive him with a procession. "Wherefore the god was wroth, and afflicted the men's private parts with a disease

1. De Morbi Venerei Curatione in India Usitata, Copenhagen, 1795.

2. On Venereal Disease in the Provinces of European Turkey. In Russian Comp. for Nat. and Med. Sci., vol. 1; Riga and Leipsic, 1815; large 8 vo., p. 230.

3. Herodotus, bk. 1, ch. 105; Homer, hymn ix, 1; Ruhnken, Epist. Crit. 1, p. 51; Heyne, Antiquarische Aufs. 1, p. 135.

4. Mythologiae, Sive Explicationis Tabularium Libri x; Frankfort, 1588, 8 vo., p. 498.

that was most grievous to them." Scioppius relates the same story in his edition of the Priapeia, and adds: "*Fuit antem morbus ille quem hodie gallicum vocamus*"—(but it was the disease which we nowadays call the French disease—syphilis). Almost the same trouble fell on the men of Lampsacus when the women began the cult of the worship of Priapus; "so they prayed to the gods to help them, and after some interval of time had elapsed (mark this careful noting of the elapse of a few days) a most grievous disease of the private parts attacked the men of Lampsacus."[5] WILLIAM LEE HOWARD, M.D.

Queries and Minor Notes.

ANONYMOUS COMMUNICATIONS will not be noticed. Queries for this column must be accompanied by the writer's name and address, but the request of the writer not to publish his name will be faithfully observed.

WHY ARE SCIENTISTS POOR WRITERS?

SAN FRANCISCO, Jan. 31, 1904.

To the Editor:—Your editorial Jan. 9, 1904, discussing why scientists are poor writers, aroused my spirit of refutation, because I think your point is not well taken. I am like the man who can neither provide nor prepare a good meal, but who can enjoy it when it is set before him; I am neither a scientist nor a good writer, but I can appreciate a good article. It all depends on the viewpoint. No doubt the scientist believes himself a good writer; it is the non-scientist who thinks he is not. The scientist loves to indulge in technicalities, precision and prolixity, while the less scientific man thinks them prosy and pedantic. The scientist scorns to reduce his style to the popular taste, while the popular writer "stoops to conquer." The scientist either loses himself in the mass of details and citations of authorities and statistics, thus putting his readers in the position of the person "looking for a needle in the haystack," or he so overwhelms them with facts that they feel as if they were wrestling with the effects of a banquet. We do not "see ourselves as others see us," and it therefore takes a non-scientific man to criticise a scientist and a scientist to squash his critic; that is your opportunity, and I presume you will make the most of it. E. G.

ANSWER.—Our correspondent's first sentence suggests that he intends refutation, what follows is instead confirmation. He has digressed from the subject and discussed the reader. We agree that a reader who is familiar with a subject, especially if he be himself a worker along that particular line of research, will understand, enjoy, and even approve a poorly written article, while one who is yet to be more than superficially interested in the subject will give it up as involving unnecessary and vexatious mental labor. Our correspondent uses the word "popular." By no means do we mean that an article should be popularized. That would be an insult to medical men. The physician of to-day must be able to understand the scientific terms that are almost daily being added to our vocabulary. An article may be full of hemolysis, amboceptors and agglutinins and yet be well written. Our correspondent should not fall into the error of the misuse of the word "scientific" and class articles as either "scientific" or "popular." It is a common error. We not infrequently are compelled to refuse publication to an article which contains valuable facts, but which is weighed down with so many imperfections as to discourage one—as does the porcupine—from closer investigation.

LISBON INTERNATIONAL CONGRESS.

MICHIGAN, Feb. 2, 1904.

To the Editor:—Will you let me know through THE JOURNAL the exact date of the International Medical Congress at Lisbon, and also when and how the delegates from the United States are appointed? A. E. G.

ANSWER.—The exact date has not been settled on so far as we know, except that it is to be in 1906. Neither have the regulations governing membership been issued. See THE JOURNAL, January 30, p. 329.

TRAINING SCHOOL FOR MALE NURSES.

Dr. E. L. Mortimer, Baltimore, answering the query in THE JOURNAL, January 30, says there is a training school for male nurses connected with Bellevue Hospital, New York City. The "Superintendent of Male Nursing School" should be addressed at 431 E. 26th street by any one interested.

5. Servius on Virgil, Geog. iv, p. 111.

Marriages.

J. A. BUSSELL, M.D., to Miss Mary Coffee, both of Rochelle, Ga., January 20.

CHARLES ULMER, M.D., to Miss Lora Angell, both of Bucyrus, Ohio, February 3.

ROBERT BAILEY NELSON, M.D., to Miss Frances Hurt, both of Jackson, Tenn., January 27.

JAMES STERRITT CALDWELL, M.D., to Miss Estelle M. Riley, both of Cincinnati, January 28.

JOSEPH A. WHITE, M.D., Dumas, Ark., to Miss Fanny Roberts of Pine Bluff, Ark., January 27.

A. BUFORD GREEN, M.D., to Miss Ida Elizabeth Vernon, both of Cartersville, Ga., January 27.

WYLLYS R. HODGES, M.D., Baltimore, to Miss Mary E. Kline, at Montgomery, Pa., January 21.

ARTHUR WEBER, M.D., New Orleans, to Miss Elizabeth Patterson of Smithville, Mo., January 27.

SAMUEL M. WORLEY, M.D., St. Augustine, Fla., to Miss Lizzie Belle Pressley of Elberton, Ga., January 18.

HERBERT WILLIAM LANDON, M.D., Lansing, Mich., to Miss Dorothy Sterling of Monroe, Mich., February 6.

FREDERICK CLIFTON MOOR, M.D., Tallahassee, Fla., to Miss Sara Margaret Howell of Washington, D. C., January 27.

Deaths.

John Herbert Sangster, M.D. Toronto University, 1864, of Port Perry, Ont., died suddenly of heart disease in Toronto, January 27, aged 72. He was a notable figure in the medical life of Ontario. He was prominent both as an educator and as a practitioner. He was principal of the Toronto Normal School from 1866 to 1871, at the same time being professor of chemistry and botany in the old Dr. Rolph's School of Medicine, which subsequently became the Medical Faculty of Victoria University, but which is now defunct. On retiring from this principalship he removed to Chicago, but after a brief residence there, returned to Canada and began the active practice of medicine at Port Perry. In 1894 he was elected a member of the Ontario Medical Council.

Edwin Barnes, M.D. Albany (N. Y.) Medical College, 1865, a member of the American Medical Association, died at his home in Pleasant Plains, N. Y., January 22, aged 59, from pneumonia followed by acute indigestion, lasting two weeks. Dr. Barnes left his medical studies at Albany Medical College to join the Army, and served in the Department of the Cumberland of West Virginia, and of the East. He had been president of the Dutchess County Medical Society, and vice-president of the New York Medical Association, and at the time of his death was consulting physician and surgeon of Vassar Hospital, Poughkeepsie.

Harry Scott Vernon, M.D. Rush Medical College, Chicago, 1900, formerly house surgeon at the Chicago Policlinic, and health officer of Lewiston, Minn., a member of the American Medical Association, died at his home in Rushford, Minn., February 1, from pneumonia, after an illness of one day.

James W. Gordon, M.D. New York University, 1889, a member of the Bridgeport (Conn.) Medical Society, Fairfield County Medical Society and Connecticut Medical Society, died at his home in Sandy Hook, Conn., January 26, from heart disease, after a long illness, aged 41.

Brainerd Leaman, M.D. Jefferson Medical College, Philadelphia, 1864, a member of the American Medical Association; surgeon during the Civil War, and ex-president of the Lancaster County Medical Society, died at his home in Leaman Place, Pa., January 28, aged 62.

Moses W. Merryman, M.D. University of Maryland, Baltimore, 1850, of Baltimore County, Md., but for seven years a resident of Atlantic City, N. J., died at his home in that place, January 25, from cerebral hemorrhage, after an illness of one day, aged 76.

William H. Gale, M.D. Jefferson Medical College, Philadelphia, 1850, a member of the Maryland legislature in 1885, and for several terms register of wills of Somerset County, died suddenly at his home in Princess Anne, February 3, from acute indigestion, aged 76.

Robert C. Sharp, M.D. Jefferson Medical College, Pennsylvania, 1881, shot himself through the heart and died January

20, while despondent on account of Bright's disease, at his home his home in What Cheer, Iowa, January 25.

Henry Benson Phillips, M.D. Vanderbilt University, Nashville, 1893, of Benson, La., died at the Sanitarium, Shreveport, La., February 3, from pneumonia following laryngitis, after an illness of ten days, aged 35.

David Krausgill, M.D. Medical College of Ohio, Cincinnati, 1879, a member of the American Medical Association, died at his home in Chesterton, Ind., January 23, from pernicious anemia, aged 56.

John S. Yard, M.D. University of Pennsylvania, 1886, who forsook medicine for architecture, died at his home in Trenton, N. J., January 23, from septicemia resulting from a retro-ocular abscess.

Thomas E. Wakefield, M.D. Castleton (Vt.) Medical College, 1843, president of the Rutland County Medical and Surgical Society in 1883, died at his home in Fairhaven, Vt., January 25, aged 82.

Robert Lambert, M.D. Faculty of Medicine of Queen's University, and Royal College of Physicians and Surgeons, Kingston, Ont., 1859, died at his home in Windsor, Ont., January 22, aged 82.

Needham M. Wilson, M.D. Jefferson Medical College, Philadelphia, 1866, died at his home in Philadelphia, January 19, three months after a fall, in which he sustained severe injuries, aged 67.

J. Varnum Mott, M.D. College of Physicians and Surgeons, New York, 1872, who retired from practice ten years ago, died suddenly from heart disease at his home in Boston, January 23, aged 53.

Frank E. Luman, M.D. Bellevue Hospital Medical College, New York, 1892, died at his home in Colusa, Cal., January 17, from the effects of an overdose of morphin, self-administered, aged 36.

Robert Hanna, M.D. Jefferson Medical College, Philadelphia, of Greenock, Pa., was run over and killed by a train on the Baltimore and Ohio Railroad near Guffey Station, January 20, aged 32.

Hermann Lewek, M.D., surgeon of the Hamburg-American steamer *Patricia*, died January 20, a day after the arrival of the steamer in New York, from pneumonia, in the German Hospital.

Byron Whitford, M.D. New York University, 1878, some-time president and treasurer of the Providence (R. I.) Medical Association, died at his home in Providence, Feb. 8, 1903, aged 53.

Fred A. Steinmeyer, M.D. Homeopathic Medical College of Missouri, St. Louis, 1870, died at his home in Bonaparte, Iowa, January 27, from the effects of a fracture of the hip, aged 59.

Charles S. Sargent, M.D. Hahnemann Medical College, Philadelphia, 1881, died at his home in Stockton, Cal., January 29, from typhoid fever, after an illness of ten weeks, aged 43.

Harrison L. Baird, M.D. Vanderbilt University, Nashville, Tenn., 1890, died at his home in Asheville, N. C., January 22, from Bright's disease, after a protracted illness, aged 37.

John Hannahan, M.D. Kentucky School of Medicine, Louisville, 1893, was found dead in his apartments in Elwood, Ind., January 25, presumably from heart disease, aged 45.

Francis Rudderow, M.D. University of Pennsylvania, Philadelphia, 1887, was recently found dead on the stairway of his home in Philadelphia, after a long illness, aged 42.

Walter D. Rexford, M.D. Baltimore Medical College, 1898, of Deming, N. M., died at Las Vegas, N. M., January 16, from consumption, after a protracted illness, aged 30.

Andrew B. Butler, M.D. Northwestern Medical College of St. Joseph, Mo., 1881, died at his home in Madera, Cal., January 15, from pneumonia, after a brief illness, aged 55.

David S. Griffith, M.D. Jefferson Medical College, Philadelphia, 1863, died at his home in Florida Mesa, near Durango, Colo., January 21, from heart disease, aged 63.

John R. Barnett, M.D. Medical College of the State of South Carolina, Charleston, 1850, died at his home in Warren, Ark., two days after a fall, on January 24, aged 74.

Albert A. Beane, M.D. State University of Iowa, Iowa City, 1891, a member of the American Medical Association, died at his home in What-Cheer, Iowa, January 25.

Alban Spooner, M.D. Hahnemann Medical College, Philadelphia, died at his home in Beverly, N. J., January 18, from pneumonia, after a short illness, aged 26.

Robert Faskett Bennett, M.D. Rush Medical College, Chicago, 1853, of Elgin, Ill., died at the Illinois Northern Hospital for the Insane, in that city, January 24, aged 77.

Henry W. Dudley, M.D. New York University, 1877, died at his home in Hillsboro, Texas, January 19, from consumption, after an illness of several years, aged 49.

E. Vernon Brower, M.D. Physio-Medical College of Indiana, Indianapolis, 1897, of Richmond, Ind., died at Boston, Ind., from tuberculosis, January 29, aged 27.

William H. H. Neville, M.D. Hahnemann Medical College, Philadelphia, 1865, of Philadelphia, died suddenly in a street car in that city, January 22, aged 64.

Robert G. Bryans, M.D. Medical College of Georgia, Augusta, 1878, a member of the American Medical Association, died recently at his home in Jackson, Ga.

Holly M. Mills, M.D. Nebraska, the pioneer physician of Polk County, Neb., died at his home in Osceola, January 28, from cerebral hemorrhage, aged 69.

Albert L. Dunn, M.D. Eclectic Medical College, Philadelphia, 1853, died at his home in Oklahoma City, Okla., from cerebral hemorrhage, January 23, aged 76.

Nels J. Lund, M.D. Eclectic Medical College of Pennsylvania, Philadelphia, 1879, died in his office in Marinette, Wis., January 22, from apoplexy, aged 74.

Jacob T. Mills, M.D. Starling Medical College, Columbus, Ohio, 1872, died at his home in Columbus, January 31, after an illness of two years, aged 65.

Phoebe Jane Babcock Wait, M.D. New York Medical College and Hospital for Women, 1871, died at her home in New York City, January 30, aged 65.

Jacob Slagle, M.D. Miami Medical College, Cincinnati, 1877, died at his home in Troy, Ohio, January 29, from injuries sustained in a street-car accident.

John D. O'Connor, M.D. Rush Medical College, Chicago, 1899, died at his home in Chicago, January 30, from meningitis, after an illness of ten days, aged 29.

William E. Moore, M.D. Northwestern Medical College, St. Joseph, Mo., 1885, died at his home in Reserve, Kan., January 22, from consumption, aged 64.

Carroll S. Parker, M.D. University of Nashville, 1870, died at his home in Gibson, Tenn., January 19, from pneumonia, after a short illness, aged 55.

Samuel Starr, M.D. Hahnemann Medical College, Philadelphia, 1869, died at his home in West Chester, Pa., January 22, from heart disease, aged 63.

Donald W. Barton, M.D. Medical College of the State of South Carolina, Charleston, 1858, died suddenly at his home in Bamberg, S. C., January 20.

John J. Brady, M.D. Bellevue Hospital Medical College, New York, 1891, of Detroit, died at Deckerville, Mich., January 23, from heart disease, aged 37.

Bennett H. Van Kirk, M.D. Jefferson Medical College, Philadelphia, 1869, died at his home in West Newton, Pa., January 24, after a lingering illness.

Henry M. Rector, M.D. Missouri Medical College, St. Louis, 1893, died at his home in Hot Springs, Ark., January 22, after a long illness, aged 47.

James H. Kyser, M.D. Tulane University, New Orleans, 1897, died in Arizona, January 27, from consumption, after a prolonged illness, aged 33.

Joseph J. Mayfield, M.D., 1850, of Bruceville, Ind., who retired from practice in 1880, died at his home in that place, January 25, aged 83.

George Thompson, M.D. Eclectic Medical College of the city of New York, 1881, died at his home in New York City, February 2, aged 87.

John D. Henry, M.D. Bellevue Hospital Medical College, New York, 1870, of Hedrick, Iowa, died in California, January 27, after a long illness.

Samuel H. Huntington, M.D. Yale University Medical Department, New Haven, Conn., 1876, died at his home in Wilton, Conn., January 22.

Charles E. White, M.D. Cleveland Homeopathic Medical College, died from diphtheria at his home in Cleveland, January 23, aged 30.

William H. Hening, M.D. Jefferson Medical College, Philadelphia, 1853, died at his home in Jefferson, Va., January 23, aged 74.

Frederick W. Vandersloot, M.D. University of Maryland, Baltimore, 1855, died at his home in York, Pa., January 13, aged 70.

Dennis N. Conner, M.D. University of Pennsylvania, Philadelphia, 1867, died at his home in Philadelphia, January 22, aged 59.

George G. Jones, M.D. University of Buffalo, 1886, died at his home in Geneseo, N. Y., January 25, after an illness of a year, aged 48.

Charles H. Niman, M.D. Bellevue Hospital Medical College, New York, 1880, died at his home in Elkhart, Ind., January 14, aged 49.

Leander Blackwell, M.D. Missouri Medical College, St. Louis, 1894, died recently at his home in South Windham, Conn., aged 36.

Lisa Whitford Brown, M.D. Homeopathic Hospital College, Cleveland, 1853, died at his home in Providence, R. I., June 1, 1903.

M. Marcus, M.D. Medico-Chirurgical College, Philadelphia, died recently from pneumonia at his home in that city, aged 26.

W. Stuart Hancock, M.D., of Wytheville, Va., died at Honolulu, Hawaii, January 1, from consumption, after a long illness.

Virgil M. D. Marcy, M.D. University of Maryland, Baltimore, 1847, died at his home in Cape May, N. J., January 21, aged 81.

Thomas F. Cawley, M.D. Bellevue Hospital Medical College, New York, died at his home in Saylorsburg, Pa., January 28.

P. H. Woolsey, M.D., a well-known physician of Orange, Sullivan and Delaware counties, N. Y., died January 12, aged 80.

Joseph A. Townsend, M.D. Baltimore University School of Medicine, 1892, died recently at his home in Lake City, Fla.

Solomon P. Stoddard, M.D. University of Heidelberg, Germany, 1863, died at his home in Indianapolis, January 27.

Walter Y. Winton, M.D. Barnes Medical College, St. Louis, 1898, died at his home in Kirbyville, Texas, Dec. 11, 1903.

Arthur C. Peirce, M.D. University of Maryland, Baltimore, 1883, died at his home in Riverside, R. I., July 26, 1903.

Richard J. Grigson, M.D. Iowa Medical College, Keokuk, 1858, died at his home in Augusta, Ill., January 16, aged 73.

Gaius H. Nash, M.D. New York University, 1864, died at his home in New York City, January 23, aged 78.

Arthur H. Ashley, M.D., died at his home in Fruit Hill, S. C., January 23, after an illness of one week, aged 40.

W. Cortland Stockton, M.D., was found dead at his home in Bluffton, Ind., from dropsy, January 24.

George Cook, M.D. Victoria, 1864, died at his home in Toronto, Ont., Dec. 31, 1903, aged 62.

James Carroll Jacobs, M.D. Rhode Island, died at his home in Providence, Jan. 24, 1903, aged 69.

O. T. Watkins, M.D., died at his home in La Crosse, Ark., January 29, aged more than 80.

Amos Ray Collins, M.D. New York University, 1861, died in Taunton, Mass., Jan. 25, 1903.

William L. Huston, M.D., was burned to death in his home at Marengo, Iowa, January 30.

Peter Broardt, M.D. New York, died at his home in Buffalo, N. Y., January 21, aged 70.

William H. Woods, M.D., died recently at his home in Owatonna, Minn., aged 80.

U. M. Humble, M.D. Illinois, died at his home in Iuka, Ill., in January, aged 73.

Harry J. Maynard, M.D., of Cheyenne, Wyo., died in Denver, January 26.

John M. Owensby, M.D., died at his home in Denison, Texas, January 30.

Deaths Abroad.

H. F. A. Peypers, M.D., died at Amsterdam, January 15. He founded eight years ago the well-known international journal *Janus*, devoted to the interests of the history of medicine and medical geography.

J. Seegen, M.D., noted for his research on diabetes, glycogen formation and elimination of nitrogen, died at Vienna, January 24, aged 81. He first settled at Carlsbad and has always ranked among the leading balneologists of the day. His views in regard to the sugar formed in the liver as the exclusive source of mechanical energy and heat have been combated by Pflüger. Among the problems which he was studying up to the time of his death are the absence of glycogen in the liver after death by suffocation, and also the continuance of the glycogen formation in excised scraps of liver tissue kept in alcohol, which arrests all fermentative and cellular action.

P. Dettweiler, M.D., died at Kronberg, January 13, aged 66. He is considered the father of the modern physico-dietetic methods of treating tuberculosis. He was a military surgeon for a few years until his lungs became affected, after which he attached himself to Brehmer at Gorbersdorf, and dedicated his entire life to the study of tuberculosis. He introduced the method of treating consumption by reclining in the open air, and published a number of works on tuberculosis. In 1876 he founded the sanatorium at Falkenstein, which has been the model for so many since. He conducted it personally until 1895. To him the world owes in large measure the revival of the belief that tuberculosis is curable.

Book Notices.

LA NEVRASTENIA. Con proemio del Prof. Clodomiro Bonfigli, Direttore del Manicomio di Roma. By Dott. Luigi Cappelletti, Vice-Direttore del Manicomio Provinciale di Ferrara. Milano: Ulrico Hoepli. 1904.

The Hoepli manuals comprise a large number of valuable little compends, they are often more than mere compilations, and many are written by men of wide reading, more or less authorities in the branches discussed. Among these we may include this little volume, and the preface, by Professor Bonfigli, fairly states its standing. The author has reviewed the subject thoroughly, and gives us one of the best brief general epitomes of the literature that we have in any language. It, of course, is available only to Italian readers at present. One of the special features of the book is an extensive bibliography of nearly 1,200 titles in which nearly all the important memoirs and works on the subject are included. There are many omissions in the English and American literature, but the more important articles have generally been included. Neurasthenia has been called an American disease, but one has only to look at this list of European literature on the subject to see that it is about as much a matter of serious consideration in almost every European country as it is here. In fact, the more serious forms are probably fully as common there, if not more so, than among us. As might be expected, Beard is the author most extensively quoted, though others such as Bouveret, De Fleury, De Giovanni, Charcot, Krafft-Ebing, Morselli and a few others are not much behind.

A NARRATIVE OF MEDICINE IN AMERICA. By James Gregory Mumford, M.D., Assistant Visiting Surgeon to the Massachusetts General Hospital. Cloth. Pp. 508. Price, $3.00. Philadelphia and London: J. P. Lippincott Co. 1903.

We can not hear too much about the hardy, practical, medical pioneers of our country. While each one who attempts to give us a biographical sketch of the founders of American medicine must necessarily repeat much that is already known; still each will find something new to say, and will present the old in a different manner and from a different point of view. We are, therefore, glad to welcome another book on the American medical pioneer and on medicine during pioneer days. The author does not assert that he gives a complete list of those of our predecessors whose names are to be found in the early annals, but he takes a few of the conspicuous ones in each era to illustrate, as it were, the conditions of that particular time. The narrative stops at the middle of the last century. A chapter is devoted to the discovery of ether, with an extremely fair statement regarding that unhappy controversy. The chapter on the founding of the American Medical Association is an interesting and instructive one; in it the author gives some inside history that is not generally known. The book is a readable one, and interesting as well as instructive. We have but one fault to find, and that is the almost universal use of the word "doctor." In the very first sentence we read: "The English brought their doctors with them," although we are not told whether this means doctors of divinity or some other kind. We have doctors of music, doctors of dentistry, doctors of divinity, doctors of law, etc. It is bearable to have the word

occur occasionally, but our author seems to be in love with it and uses it so much that it mars the reading. In spite of this criticism, we can only repeat that the book is not only readable, but a valuable addition to the early medical history of our country.

LESSON ON MASSAGE. By Margaret D. Palmer, Masseuse and Manager of the Massage Department of the London Hospital. Second Edition. Cloth. Pp. 261. Price, $2.50. New York: William Wood & Co. 1904.

In this second edition there have been some minor improvements and the addition of chapters on the Nauheim treatment and on bandaging. The book is intended for the first study by the masseur or nurse, and is a very good book for the physician to recommend for this purpose. The summary of anatomy is complete and well selected and arranged.

State Boards of Registration.

COMING EXAMINATIONS.

Regular Board of Medical Examiners for Georgia, Atlanta, March 3. Secretary, I. H. Goss, M.D., Athens.

Regent of the State Board of Medical Examiners of New Hampshire, State House, Concord, March 1-2. Regent, Channing Folsom, M.D., Concord.

Board of Registration in Medicine for Massachusetts, State House, Boston, March 8-9. Secretary, Edwin B. Harvey, M.D., State House, Boston.

Committees of Examination of Connecticut, New Haven, Hartford and Waterbury, March 8. Secretary, Prof. C. A. Lindsly, New Haven.

Maine Board of Registration of Medicine, Portland, March 23. Secretary, A. K. P. Meserve, M.D., Portland.

Maine Report.—Dr. A. K. P. Meserve, secretary of the Maine Board of Registration of Medicine, reports the examination, partly oral and partly written, held at Augusta, Nov. 11, 1903, as follows: Subjects, 9; questions, 90; percentage required, 75; candidates, 18, all of whom passed. The candidates are summarized below by colleges, the year of graduation and grade of each being given.

PASSED.

College.	Year Grad.	Per Cent.
Kentucky School of Medicine	(1903)	82
University of Michigan	(1898)	93
Harvard University	(1901)	94 3/7
Laval University (Quebec)	(1903)	83 6/7
Boston University Medical School	(1903)	90 3/7
University of Maryland	(1903)	84 6/7
Columbia University	(1896)	90 2/7
Chattanooga Medical School	(1903)	78 4/7
Medical School of Maine	(1901)	88 4/7
McGill University	(1903)	91 3/7, 85 4/7, 85 3/7
Univ. of Pennsylvania	(1903)	90 1/7, (1901) 88.2, (1887) 90 2/7
Laval Univ. (Montreal)	(1903)	88 4/7, (1901) 90 2/7, (1899) 86.9

Rhode Island Report.—Dr. G. T. Swarts, secretary of the Rhode Island State Board of Health, reports the written examination held at Providence, Jan. 7 to 8, 1904, as follows: Subjects, 11; questions, 70; percentage required, 75; candidates, 12; passed, 11; failed, 1.

PASSED.

College.	Year Grad.	Per Cent.
Bowdoin College	(1903)	76.4
College of Physicians and Surgeons, Baltimore	(1903)	78.7
College of Physicians and Surgeons, New York	(1903)	75.7
Dartmouth College	(1896)	89.1
Georgetown University	(1903)	88.2
Harvard University	(1901)	93.6
Manitoba Medical College	(1891)	79.4
Medico-Chirurgical College, Pennsylvania	(1898)	76.5
Tufts College, Boston	(1896)	76.6
University of Maryland	(1892)	84.0
University of Vermont	(1903)	85.4

FAILED.

College of Physicians and Surgeons, Baltimore	(1902)	70.0

Minnesota Report.—Dr. C. J. Ringnell, secretary of the Minnesota State Board of Medical Examiners, reports a written examination held at St. Paul, Jan. 5 to 7, 1904, as follows: Subjects, 12; questions, 95; percentage required, 75; candidates, 27; passed, 24; failed, 3.

PASSED.

Medical Department of the University of Minnesota, (1902) 78.3†, (1899) 77.6*.
Johns Hopkins Medical School, (1902) 83.9.
Medical Department of the University of Iowa, (1891) 78.3†, (1902) 77.6.
Rush Medical College, (1903) 78.4, 87.1, (1902) 82.1, (1900) 87.3.
Med. Dept. of the University of Illinois, (1903) 76.4†, 75.5*, 77.9*, 77.6, (1887) 82.5.
Queen's University, (1899) 79.6, (1901) 84.6.
Hamline University, (1903) 76.7, 76*.
Boston University, (1901) 84.3.
Hahnemann Medical College, (1902) 79.2*.
Northwestern University Medical School, (1901) 87.3.
Barnes Medical College, (1900) 76.9.
Trinity University, (1900) 83.5.
Imperial Alexander's University, (1896) 83.3.

FAILED.

Hamline University, (1903) 65.8*, 67.1.
College of Physicians and Surgeons, Keokuk, (1884) 56.

* Second examination. † Third examination.

The following questions were asked:

DISEASES OF WOMEN.

1. Describe Alexander's operation and state under what condition it is indicated. 2. Acute oöphoritis, etiology, symptomatology and treatment. 3. Infectious vaginitis, varieties and causes of each, symptomatology and treatment. 4. Rectovaginal fistula, etiology, symptomatology, diagnosis and treatment. 5. Curettage of the uterus, give indications for and describe operation.

DISEASES OF CHILDREN.

1. Bronchopneumonia, etiology, pathology, symptomatology, diagnosis and treatment. 2. Rachitis, etiology, symptomatology, pathology, prognosis and treatment. 3. Chorea, etiology, symptomatology, prognosis and treatment. 4. Influenza, etiology, pathology, symptomatology, diagnosis, prognosis and treatment. 5. Chronic constipation of infancy, causes, prognosis and treatment.

HISTOLOGY AND PATHOLOGY.

1. Give a histologic description of the mammary gland. 2. Give a histologic description of the ovary. 3. Define and give classification of glands. 4. What morbid changes take place in the kidney in tubercular nephritis? 5. Give the pathology of chronic arteritis. 6. Give the pathology of empyema. 7. Describe fatty and amyloid degeneration. 8. Name some of the animal parasites found in man. 9. Give the clinical significance of leukocytosis, and the normal leukocyte count in the male and female. 10. Describe fully how you would prepare, stain and examine sputum for the presence of tubercle bacilli.

OBSTETRICS.

1. What bones enter into the formation of the pelvis? Give diameters of the superior strait of the pelvis. 2. What are the different positions of the head in vertex presentation? 3. What if any other presentation of the head is there? How would you manage these cases if conducting them? 4. Eclampsia? Causes? Treatment? 5. Give treatment for prolapsus funis. 6. How do you conduct third stage of labor? 7. What conditions would cause you to advise (*a*) embryotomy? (*b*) Cesarean section? (*c*) Premature labor? 8. What antiseptic precautions do you use in conducting a case of labor in so far as it affects the welfare of (*a*) mother? (*b*) Of child?

ANATOMY.

1. Describe the femur. 2. Name the bones which form the wrist joint. 3. Describe the sartorius muscle, giving origin and insertion. 4. Describe the aorta, naming its divisions. 5. Outline the portal circulation. 6. Describe the solar plexus. 7. Describe the thoracic duct. 8. From what is the serous investment of the stomach derived? 9. Into what parts is the brain divided? 10. Give general description of the tongue.

THEORY AND PRACTICE OF MEDICINE.

1. Give general classification of anemia, and give causes. 2. Define tachycardia and give causes. 3. Give definition and prognosis of rheumatoid arthritis. 4. Give prognosis and treatment of hemoptysis. 5. Give symptoms and treatment of Basedow's disease. 6. Briefly outline the differential diagnosis between typhoid fever and acute miliary tuberculosis. 7. Give the clinical varieties of dysentery and the different ways in which it occurs. 8. Name three common factors in the production of ascites, and give five abdominal conditions from which it must be differentiated. 9. Give varieties and treatment of round worms. 10. Give causes of intestinal obstruction.

SURGERY.

1. Give diagnosis and treatment of renal calculus. 2. Describe a tracheotomy. 3. Give technic of ligation of common carotid. 4. Describe operation for hare-lip. 5. Give technic of skin grafting. 6. Give treatment for necrosis in shaft of bone. 7. Give treatment for synovitis with effusion. 8. Give treatment for fracture of the body of a vertebra. 9. Diagnosis and treatment for fracture of inferior maxillary. 10. Briefly, treatment for infections in general.

EYE AND EAR.

1. Define tinnitus aurium, amblyopia, keratitis, myopia and blepharitis. 2. Give symptoms and treatment of trachoma. 3. What is iridectomy and when is it indicated? 4. Differentiate between acute iritis and acute glaucoma. 5. Give symptoms and treatment of acute otitis media.

CHEMISTRY, URINALYSIS AND TOXICOLOGY.

1. Give symptoms and treatment of carbolic acid poisoning. 2. Define molecule, inorganic chemistry, toxicology, atom and ptomain. 3. Differentiate between fermentation and putrefaction. 4. Give a quantitative and a qualitative test for sugar in the urine. 5. What is Marsh's test for arsenic?

PHYSIOLOGY.

1. Take up, briefly and in your own way, the subject of hemoglobin and oxy-hemoglobin. 2. Explain the abnormal amount of albumin present in the urine in a case of acute desquamative nephritis, from a purely physiologic standpoint, and, in a general way, what conditions, pathologic or other, influence the amount of serum-albumin eliminated by the kidney. 3. Follow the process of reproduction after conception has taken place (omitting the previous steps of the process). 4. Tell something of white corpuscles, including their behavior under certain conditions of health and disease. 5. Does the cause of the rhythmic heart beat lie within the

heart itself, or in the central nervous system? Can you suggest any experiment tending to prove the correctness of your answer to the above question? 6. If the vagus nerves were cut what effect would this have on the frequency of the heart-beat, and why? 7. Show how the lacteals take up and dispose of their share of products of food digestion. 8. Define and classify enzymes. 9. Name and give sources of two ferments which enter into the process of food digestion. 10. What is the function of the posterior columns of the spinal cord?

MATERIA MEDICA AND THERAPEUTICS.

1. Give the temperatures (Fahr.) respectively of a cold bath, a tepid bath, a hot bath. 2. Describe the process of peptonizing milk. 3. Name the three best hypnotics and the average adult dose of each. 4. Write a prescription for an ointment for a case of psoriasis. 5. Criticise this prescription for an adult:

℞ Hydrargyri protoiodidi.....grs. lv.
Potassii iodidi.....drachms ij.
Aquæ.....oz. iv.
Misce et solve. Sig.: Dose, a teaspoonful in water three times a day.

6. Give the adult dose of sulphate of atropia; arsenious acid; extract of cannabis indica; nitroglycerin; acetate of lead. 7. What is the source of cantharides, the name of the official preparation for internal use and the average dose for an adult? 8. What is the active principle or principles of Fowler's solution, of paregoric, of compound cathartic pills, of compound licorice powder, of Vienna paste? 9. What is the best preparation of lead for external use? 10. Prescribe iron as a tonic in pill form for an adult.

HOMEOPATHIC MATERIA MEDICA.

1. What in brief is the general physiologic action of aconite? 2. Give four characteristics of aconite. 3. What are the characteristic stomach symptoms of pulsatilla? 4. In what class of patients is nux vomica most applicable, and mention three general characteristics of the drug? 5. Differentiate between bell., hyos. and stram. in delirium. 6. Give five characteristics of ars. alb. 7. Differentiate between phos. rumex and bell. in coughs. 8. What are the skin symptoms of graph. mez. and petroleum? 9. Give indications for merc. bin. in throat affections. 10. Differentiate between rhus and bry. in rheumatism.

ECLECTIC MATERIA MEDICA AND THERAPEUTICS.

1. Name some remedies to be used in treatment of frostbites; of burns, and tell how you would use them. 2. Give the symptomatology and dose of sanguinaria, ipecac, asclepias and strophanthus. 3. In a case of la grippe, what remedies would you likely find indicated and how would you use them? 4. What is the physiologic action of cascara sagrada, hydrargyrum, elaterium and baptesia; give the medicinal dose of each? 5. Give conditions calling for use of iron, and name some of the best iron compounds. 6. Give use and dose of saw almetto, buchu, and *Rhus aromatica*. 7. Give dose and use of *Crataegus oxycanthus;* when would you combine it with apocynum? Write a prescription for such a combination. 8. What remedies would you need in treating a case of delirium tremens? Give conditions in which you would use each, and the dose. 9. What is the matter with the following:

℞ Hydarg. chl. mite.....gr. iii.
Calcium sulphid.....gr. v.
Sac. las.....gr. xxiv.
M. Ft. chart. No. 12. Sig.: Take powder every two hours.

℞ Potassium iodid.....gr. iii.
Quinin.....gr. i.
Syr. aurant.....3ss.
Aqua ad.....3ii.
M. Sig.: Take as directed.

10. What is the dose of trional, strychnia sulph., belladonna, aconite, lobelia, nitroglycerin?

MEDICAL JURISPRUDENCE.

1. What is the postmortem evidence of live birth? 2. How soon does a body exposed to the air in summer begin to decompose? 3. What is medical malpractice? 4. What are the chief physical characteristics of the fetus at the end of the third month of gestation? 5. With what conditions is acute morphia poisoning most likely to be confounded?

Association News.

THE ATLANTIC CITY SESSION.

Arrangements Being Perfected—Committees are Active.

Dr. Philip Marvel, secretary of the Committee of Arrangements for the next annual session of the American Medical Association, to be held at Atlantic City, N. J., June 7-10, 1904, reports that the arrangements are assuming good form with the prospect of completeness, except in the smaller details, at a comparatively early date. The hotel bookings are already very active, and the hotel committee urges those who are desirous of first-class quarters to arrange for them without delay. The list of houses in THE JOURNAL last week contains only the few selected as headquarters for the sections. For the members who have no particular reason for selecting accommodations at any one of these hotels, there are a hundred or more of other hotels at which good accommodations may be had. Dr. Marvel will be glad to furnish any further information desired by members of the Association from time to time, when requested. The personnel of the committee and the chairmen of the subcommittee are as follows:

Dr. B. C. Pennington, chairman; Dr. J. A. Joy, treasurer; Dr. E. A. Reilly, registrar; Dr. Philip Marvel, secretary.

CHAIRMEN OF SUBCOMMITTEES.

Dr. W. Blair Stewart, Finance.
Dr. Walter Reynolds, Halls and Meeting Places.
Dr. E. A. Reilly, Registration.
Dr. A. D. Cuskaden, Exhibits.
Dr. Theo. Senseman, Entertainments.
Dr. E. C. Chew, Bureau of Information.
Dr. Emery Marvel, Banquets.
Dr. Edward Guion, Printing.
Dr. W. E. Darnell, Hotels.
Dr. Joseph F. DeSilver, Badges, etc.
Dr. W. P. Conaway, New Membership.
Dr. J. M. Marshall, Transportation.

New members for the month of January, 1904:

ALABAMA.

Harper, G. H., Manistee.
Wheeler, T. T., Steele.
Howell, J. R. G., Dothan.
Welch, S. W., Talladego.
Letcher, Jos. B., Shorter.
Dixon, D. P., Thomas.
Cullens, F. B., Ozark.
Rountree, W. S., Wylam.
Walker, Jos. C., Mayline.
Lathem, S. N., Blossburg.
Martin, Wm. G., Adamsville.
Stallworth, E. L., Evergreen.
Rogan, B. B., Selma.

ARKANSAS.

Rosamond, J. H. E., Grand Lake.
Thorn, J. W., Clio.
Thomas, Philip E., Clarendon.
Morgan, Chas. M., Camden.
Jacobs, Jesse Jackson, Webb City.
Hamilton, A. J., Calmer.
Hartsell, Wm. L., Pansy.
McKenzie, A. H., Casa.
Meek, J. W., Camden.
Osborne, J. M., Wiville.
Corn, J. S., Nashville.

CALIFORNIA.

Sharp, Jas. G., San Francisco.
Crise, David, Escondido.
Mosgrove, Anna Marie, San Francisco.
Middleton, Johnson Van Dyke, San Francisco.
Thorwick, Martha G., San Francisco.
Poore, Jas. E., Sacramento.
Eckardt, A. O., Gualala.
Oliver, H. R., San Francisco.
Bryant, Chester M., Redding.
O'Connor, Jas. H., San Francisco.
Lucas, Wm. Thos., Santa Maria.
White, David W., San Bernardino.
Gardner, Sam'l Jas., San Francisco.
Taylor, Oscar N., San Francisco.
James, J. W., Sacramento.

COLORADO.

Peden, B. A., Manzanola.
Cooke, John M., Colorado Springs.
Neeper, Edw. R., Colorado Springs.
Roberts, Judson O., Cripple Creek.
Beck, L. H., Manitou.
Condit, H. C., Florence.
Hawes, Mary, Denver.
Nesmith, Frances M., Denver.
Harlow, Wm. P., Boulder.

CONNECTICUT.

Day, F. L., Bridgeport.
Mulcahy, Thos. A., Hartford.
Whittemore, Edw. Lancaster, New Britain.
Mayer, Nathan, Hartford.
Wilson, Wm., Wallingford.
Rand, Richard Foster, New Haven.
Stevens, Frank W., Bridgeport.
McDonnell, Ralph A., New Haven.
Rowley, Alfred W., Hartford.
Ellis, Thos. L., Bridgeport.
Goodrich, Chas. A., Hartford.
Varno, Henry G., Thompsonville.
Tukey, F. M., Bridgeport.
Botsford, Chas. P., Hartford.
Gold, Jas. D., Bridgeport.
Hyde, F. C., Greenwich.

FLORIDA.

Maynard, B. H., Webster.
Kinsey, Junius P., Lamont.
Weedon, L. W., Tampa.

GEORGIA.

Barnum, R. E. L., Richland.
Adair, Robt. E., Taylorsville.
Thrash, Elmore C., Oakland.
Bomar, E. P., Ohoopee.
Clarke, L. B., Atlanta.
Kemp, A. P., Barnesville.
Jennings, W. J., Blakely.
Hunter, A. P., Tifton.
Borders, Dennis J., Calhoun.
Bell, Addison K., Madison.
Davis, Jas. P., Tennill.
Neal, Jos. W., Scotland.
Jones, Wm. T., Atlanta.
Fischer, L. C., Atlanta.
Comer, Ralph, Tignall.
Elder, Eugene B., Macon.
Bush, Oliver B., Cairo.
Roberson, G. W., Macon.
Harper, Aubrey, Wray.

ILLINOIS.

Nichols-Schmaling, Hannah, Fulton.
Dunham, Frank, Robinson.
Tallman, E. D., Chicago.
Mann, Alban L., Elgin.
Buzik, Julius, Chicago.
Wales, R. P., Mt. Carroll.
Friedberg, S. A., Chicago.
Harmon, Henry, Chicago.
Bennett, Wm. H., Chicago.
Hall, S. B., Rock Island.
Taliaferro, Frank, Chicago.
Brown, Alice Barlow, Chicago.
Schwuchow, Walter B., Princeton.
Stowell, L. E., Williamsfield.
Pridmore, Geo. W., Industry.
Starkey, Harvey L., Junction.
Hay, E. J., Millersburg.
Palmer, Geo. T., Chicago.
Friedberg, S. A., Chicago.

INDIANA.

Aydelotte, Thos., Lyons.
Elrod, E. L., Henryville.
Gobbel, Frederick R., English.
Sandy, W. J., Martinsville.
Gillespie, J. F., Reelsville.
Meloy, J. M., Sellersburg.
Brudi, G. G., New Haven.
Barandy, Oscar von, So. Bend.
Mansfield, Thos. J., Muncie.
Thompson, Wilson H., Matthews.
Zaleski, Jos. P., So. Bend.
Giltner, H. A., Lexington.
Pettigrew, Chas. D., Houston.
Beard, E. R., Liberty.
Whetsell, Leon E., Bloomington.
McCracken, A. J., Richmond.

IOWA.

Leffler, Edw. G., La Porte City.
Dunkelberg, E. E., Waterloo.
Thompson, G. B., Winthrop.
Smith, Ralph, Red Oak.
Sala, Ono P., Davenport.
Brunig, H., Mineola.
Sigworth, Jr., H. W., Anamosa.
Boice, C. A., Washington.
Washburn, T. R., Donnellson.
Greensfelder, Louis A., Chicago.
Stoecks, Wm. A., Davenport.
DeGraff, Elmer B., Davenport.
Noe, Chas. T., Amana.
Boes, F., Davenport.
Holtsclaw, Z. T., Larchwood.
Johnston, E. N., Fredericksburg.
Amdor, Frank P., Carbon.
Bowen, Will, Ft. Dodge.

KANSAS.

Peers, T. W., Topeka.
Relihan, D. W., Smith Center.

KENTUCKY.

Ward, J. Scott, Pineville.
Evans, Will K., Pineville.
Calvert, J. H., Milton.
Hiestand, C. V., Merrimac.
Jasper, Galen E., Waterloo.
Heath, Chas. L., Lindsay.

Wallingford, J. Stuart, Paris.
Thornton, Geo. G., Lebanon.
Bloch, Leo, Louisville.
Jones, L. O., Hebbardsville.
Paschall, A. F., Crossland.
Finck, T. D., Louisville.
Clark, H. C., Falmouth.

LOUISIANA.

Kellogg, Wm. A., Innis.
Stewart, G. McG., Laurel Hill.
Hunter, Edwin W., Gallion.
Abramson, Louis, Shreveport.
Botts, Wm. F., Shreveport.
Mobley, Jesse Woods, Allentown.

MAINE.

Cummings, E. S., Lewiston.
Lamb, Frank W., Portland.
Dyson, Wallace W., Portland.
Lewis, Philip P., Gorham.
Bryant, Bertram L., Bangor.

MARYLAND.

Ruhrah, John, Baltimore.
Hartman, Jacob H., Baltimore.
Thomas, Richard H., Baltimore.
Hemmeter, John C., Baltimore.
Cathell, D. W., Baltimore.
Larned, Chas. W., Baltimore.
Riely, Compton, Baltimore.
McCormick, Thos. P., Baltimore.
Davis, Jr., John Staige, Baltimore.
Whitney, E. L., Baltimore.

MASSACHUSETTS.

Bartol, John W., Boston.
Blanchard, R. H., Pittsfield.
Greene, Thos. F., Roxbury.
Wilbur, Sarah M., Springfield.
Harris, C. E., Hyannis.
Calkins, Irving R., Springfield.
Rollins, Edwin T., Boston.
Taylor, Geo. L., Holyoke.
McKenna, Francis P., Boston.
Marsh, James E., Springfield.
Goodrich, Harriet R., Salem.
Jones, Mary Scott, Boston.
O'Connor, J. J., Holyoke.
Simpson, James E., Salem.
Griffin, Arthur G., Malden.
Dodd, I. F. S., Pittsfield.
Harrington, Francis B., Boston.
Burr, Noah A., Springfield.
Dearing, H. S., Boston.
Burnham, Edmund A., Boston.
Emery, Geo. E., Worcester.
Howard, E. Henry, Pittsfield.
Cooper, Almon, Brookline.
Dix, Geo. A., Worcester.
Beal, Howard W., Worcester.
Merrill, Quincy H., Leominster.
Redmond, Jas. W., So. Boston.
Millett, Wilfred A., Pittsfield.
Baker, Osmyn, Northampton.
Greene, Edw. M., Boston.
Ryder, Jas. W., Boston.
Chapman, Chas. R., Springfield.
Wentworth, Wm. W., Pittsfield.
Pierson, Edward L., Salem.
Wetherell, Arthur B., Holyoke.
Hutchinson, Edwin D., Westfield.
Jackson, Chas. W., Monson.
McKeen, Sylvester F., Allston.
Clarke, Louis H., Holyoke.
Cushing, Hayward W., Boston.
Bernard, Barnard L., So. Boston.
Burnham J. Forrest, Lawrence.
Bates, W. S., Barre.
Dennett, Daniel C., Winchester.

MICHIGAN.

Eldred, Joseph N., Chesaning.
Harrison, L. C., Battle Creek.
Barney, L. S., Leonidas.
Grant, F. E., Athens.
Bayley, Wesley G., Carlton Center.
Maas, Rudolph J., Hancock.
Blaisdell, R. H., Sheridan.
Bell, T. H. E., Montgomery.
Jones, L. C., Kalamo.
Cochran, L. E., Peck.
Friedlander, Bernhard, Sebewaing.
Kelly, Edw. H., Ironwood.
Evans, E. J., Rockland.
Lawton, G. W., Jennings.
Orton, Ellsworth, Waterford.
Schultz, Samuel, Coldwater.
Maxwell, Jas. E., Decatur.
Belanger, Henry, River Rouge.

MINNESOTA.

Werner, O. S., Lindstrom.
Wood, Douglas F., Hanska.
Lewis, W. W., St. Paul.
Meade, C. J., St. Paul.

MISSISSIPPI.

Crook, H. L., Jackson.
Mitchell, C. D., Pontotoc.
Biles, J. D., Sumner.
Hamilton, Wm. W., Brooksville.
Price, T. M., Raymond.
Coker, D. W., Tunica.
Frizell, Jr., W. H., Brookhaven.
McCain, Geo. H., Coldwater.
Garrison, H. F., Seminary.
Pollard, Marquis L., Eden.
Barksdale, J. W., Valden.
Backstrom, John G., Tutwiler.

MISSOURI.

Lindley, W. T., Hamilton.
Clark, Chas. E., Kansas City.
Neff, Robt. L., Joplin.
Hempel, Max, St. Louis.
Williams, Ira, Maitland.
Dunigan, Jas. P., Sullivan.
Luscher, L. W., Kansas City.
Henderson, F. L., St. Louis.
Horwitz, M. R., St. Louis.
Simmons, B. B., Oregon.
Bullock, F. E., Forest City.
Krebs, F. J. V., St. Louis.
Anderson, J. N., Conway.
Murray, E. W., Parkville.
McEuen, O., Shannondale.
Dallas, L. W., Hunnewell.
Edmonds, O. R., Tina.
Van Eman, F. T., Kansas City.
Norris, T. J., Macon.

NEBRASKA.

Campbell, Thos. F., Cody.
Devries, J. S., Fremont.
Sundbury, P. A., Holdrege.
Hull, Geo. M., Kearney.
Wiley-Ralston, Adda, Omaha
Beck, F. L., Ong.
Fleming, H. C., Falls City.
Baxter, Mark Wm., Prosser.
Sadler, W. W., Bee.
McDonald, Jas. L., Atkinson.
Hoff, A. E., North Bend.
Peterson, Wm. A., Elgin.
Waller, Jos. E., Salem.
Myers, E. M., Bennet.
Orr, H. W., Lincoln.
Weidner, S. S., Fairbury.

NEW HAMPSHIRE.

Huckins, T. H., Tilton.
Morey, G. B., Manchester.

NEW JERSEY.

Wintersteen, J. B., Moorestown.
Koch, L. A., Newark.
Pinneo, F. W., Newark.
Hawkes, E. W. Z., Newark.
Berner, David, Egg Harbor City.
De Silver, J. F., Atlantic City.
Foster, Wm. S., Flanders.
Moenig, Jos. A., Park Ridge.
Decker, F. H., Frenchtown.
Stevenson, W. D., Trenton.
Levy, H., Perth Amboy.

NEW YORK.

Bacon, C. B., Brooklyn.
Graney, Chas. D., Le Roy.
Smith, F. C., Fleming.
Duel, Arthur B., New York City.
Genung, Homer, Freeville.
Latcher, Marshall, Oneonta.
Douglas, F. J., Utica.
Maynard, E. H., Nyack.
Schwerd, Max J., New York City.
Walker, Eloise, Hudson.
Preston, Jas. L., Kingston.
Peterson, Frederick C., Watertown.
Lettice, F. E., Watertown.
Gardner, Levi E., Black River.
Masson, Thos., Cape Vincent.
Calkins, Fred'k R., Watertown.
Yates, David G., New York City.

NORTH CAROLINA.

Ballou, Jas. L., Crumpler.
Jones, Arthur L., Brandon.
Duncan, G. F., U. S. Army, No. Wilkesboro.

OHIO.

Nelson, Lockhart, Hillsboro.
Cherry, W. T., McArthur.
Levison, Lewis A., Toledo.
Lyne, G. L., New Paris.
McCullough, G. E., Troy.
Stewart, J. O., Cedarville.
O'Brine, David, Urbana.
Davy, J. O., Springfield.
Miller, A. C., Covington.
Beckwith, Anson B., London.
Robe, Orin W., Portsmouth.
Yeomans, Wm. L., Bucyrus.
Kurtz, Harry B., Cleveland.
Parke, Milton J., Cleveland.
Kidd, Robt. A., Shepard.
Combs, Rebecca V., Columbus.
Hanson, D. S., Cleveland.
Watson, J. L., Toledo.
McConnaughey, Van B., Hillsboro.
Mackenbach, C. W., Montezuma.
Ackerman, E. V., Fredericktown.
Weir, Wm. H., Cleveland.
Berlin, W. C., Cleveland.

OKLAHOMA.

Stewart, B. F., Britton.
Lain, E. S., Weatherford.
Mayberry, E. A., Enid.
Hatchett, John A., El Reno.
Browning, J. W., Geary.
Hulen, F. P., Pond Creek.
Fleming, J. R., Sinnett.
Kelso, M. A., Enid.

OREGON.

Estes, Oris B., Astoria.
Vernon, Nellie S., Astoria.
Tuttle, Jay, Astoria.
Cartwright, Richard, Salem.
Patton, Matthew J., Astoria.
Tilzer, A., Portland.

PENNSYLVANIA.

Sears, W. H., Huntingdon.
Kurtz, J. E., Reading.
Gans, S. Leon, Philadelphia.
Klemm, Adam, Philadelphia.
Fritz, W. Wallace, Philadelphia.
Sprissler, Theo., Philadelphia.
Hannum, Wm., Hatboro.
Bachman, Gustavus A., Philadelphia.
Goldberg, H. G., Philadelphia.
McAboy, C. Bradford, Pittsburg.
Hume, John E., Philadelphia.
Shea, Wm. K., Philadelphia.
Bare, Horace C., Philadelphia.
Embery, Frank, Philadelphia.
Arnold, Jesse O., Philadelphia.
Wagner, L. F., Reading.
Marshall, Clara, Philadelphia.
Schell, J. Thompson, Philadelphia.
Dripps, J. H., Philadelphia.
Newbold, Henry A., Philadelphia.
Kilgore, Frank D., Harrisburg.
Chapin, L. S., Philadelphia.
Johnson, Wm. N., Philadelphia.
Coates, Geo. M., Philadelphia.
Bradley, W. N., Philadelphia.
MacIntosh, Jas. W., Philadelphia.
Dye, Frank H., Philadelphia.
Tucker, Henry, Philadelphia.
Skillern, Ross H., Philadelphia.
Small, W. B., Philadelphia.
Kamerly, Jr., E. F., Philadelphia.
McElhaney, C. W., Greenville.
Ellis, C. J., Pittsburg.
McAdams, Wm. J., Pittsburg.
Gentry, C. C., Antrim.
Bassett, H. L., Yardley.
Brown, S. H., Philadelphia.
Holbert, J. F., Fairchance.
Alexander, G. L., Lancaster.
Morgan, Arthur C., Philadelphia.
Solt, Thos. J., Mountain Top.
Schappert, N. L., Wilkesbarre.
Davison, Wm. F., Dorranceton.
Hitchens, Arthur P., Glenolden.
Barnes, Chas. S., Philadelphia.
Krug, J. A., Philadelphia.
Fischelis, Philipp, Philadelphia.
Flynn, J. C., Philadelphia.
Thomason, W. P. O., Easton.
McKeage, Wm., Philadelphia.
Wise, Geo. G., Philadelphia.
Felt, Carle Lee, Philadelphia.
Weber, Henry F., Philadelphia.
Umsted, Wm. M., Philadelphia.
Hollingshead, I. W., Philadelphia.
Carpenter, Hubert, Philadelphia.
Ullom, Josephus T., Philadelphia.
Nock, Thos. O., Philadelphia.
Leidy, Jr., Jos., Philadelphia.
Willits, I. P., Philadelphia.
Buchanan, Mary, Philadelphia.
Hamilton, G. V., Warren.
Wright, W. J., Duncannon.
Tarr, Robt. F., Kittanning.
Ashley, Shaile L., Plymouth.
Wheeler, Edwin B., Philadelphia.
Harris, Geo. F., Bellefonte.
Seabrook, Alice M., Philadelphia.
Haehnlen, W. F., Philadelphia.
Roebuck, J. P., Lilitz.
Bolin, J. Albert, Philadelphia.
Forst, John R., Philadelphia.
Mann, E. S., Dallastown.
Owens, A. C. K., Pittsburg.
Shope, E. L., Harrisburg.

RHODE ISLAND.

Jackson, Frank H., Providence.
Lyon, Donald B., Pawtucket.
Kerins, John Francis, Providence.
Cheever, John H., Pawtucket.
Potter, Henry B., Providence.
Cutts, Wm. Bryant, Providence.
Stone, Ellen A., Providence.
Deacon, Chas. F., Providence.
Randall, Arthur G., Providence.
Munro, Catherine N., Providence.

SOUTH CAROLINA.

Wilson, Jr., Robert, Charleston.

SOUTH DAKOTA.

Holmes, Alva E., Verdon.
Koobs, Herman J. G., Scotland.
Class, F. L., Huron.
Mathewson, Angus, Bristol.
Christianson, Martin M., Hazel.

TENNESSEE.

Haynes, Eugene E., Memphis.
Burdett, George M., Lenoir City.
Malone, Wm. B., Memphis.
Haywood, Jno. Lee, Columbia.
Plunkett, Jas., Nashville.
Hydes, Robt. L., Isabella.
Teas, Jas. Jos., Oakville.
Waller, J. J., Oliver Springs.
Roberts, W. E., Jefferson City.
Taylor, Thos. F., Friendship.
Roberts, W. E., Talbotts.
Ferguson, R. F., Clarksville.
Bogart, W. G., Chattanooga.

TEXAS.

Gustine, N. W., Dalys.
Connor, W. E., Cumby.
Leache, Herbert F., Aledo.
Lacy, Robert Y., Pittsburg.
Lee, Geo. H., Galveston.
Phillips, J. D., Tyler.
McMullin, H. R., Green.
Carman, E. M., Red Oak.
Self, Thos. Newton, Cleburne.
Harwood, M. V., Hubbard City.
Gerau, Thos. C., Petty.
Black, R. C., Gainesville.
Lipscomb, W. C., Crockett.
Pollard, W. J., Kaufman.
Watt, W. Neal, Austin.

UTAH.

Snow, Leslie W., Salt Lake City.

VERMONT.

Start, S. Gould, Cambridge.
Gibson, Jno. M., McIndoe Falls.

VIRGINIA.

Blanton, J. C., Richmond.
Wayland, A. Bledsoe, Crozet.
Kellam, S. S., Belle Haven.
Grinnan St. George T., Richmond.

WASHINGTON.

Durand, W. S., Everett.
Hall, J. F., Albion.
Lentz, Jos. D., Farmington.

WEST VIRGINIA.

Hume, Wm. A., Quinnimont.
Rymer, H. M., Harrisville.
Gordon, Patrick L., Corbin.
Hume, Benj. L., Prince.
Poole, Albimus, West Union.
Deem, Hamline N., Tyner.
Rickey, Jno. W., Moundsville.

WISCONSIN.

Reynolds, Jas. C., Lake Geneva.
Strauss, F. H., Milwaukee.
Brown, Jno. F., Waupun.
Scanlan, Peter L., Lancaster.
Howard, J. J., Columbus.
Junck, Jno. A., Sheboygan.
Zeiss, Anton, Sheboygan.
Juergens, L. W., Fredonia.
Rood, J. F., Darien.
Jegi, Henry A., Galesville.
Ellis, W. E., Prentice.
Eddington, Royal, Wauwatosa.

The Public Service.

Army Changes.

Memorandum of changes of stations and duties of medical officers, U. S. Army, for the week ending Feb. 6, 1904:

Yost, John D., asst. surgeon, relieved from temporary duty at Fort Mason, Cal., and from duty as examiner of recruits, San Francisco.

Farr, Charles W., asst.-surgeon, in addition to his present duty at Fort Mason, Cal., to examine recruits, San Francisco.

Turnbull, Wilfrid, asst-surgeon, relieved from duty at Fort Monroe, Va., and ordered to Fort Strong, Mass.

Dean, Elmer A., asst.-surgeon, relieved from duty at Fort Strong, Mass., and ordered to Fort Riley, Kan., for duty.

Wales, Philip G., and Wells, Geo. M., surgeons, and Wolfe, Edwin P., and Shockley, M. A. W., asst.-surgeons, sailed from San Francisco on the *Sheridan*, en route to Manila, P. I.

Murray, Alex., asst.-surgeon, is assigned to duty as surgeon on transport *Sheridan*, to take effect on arrival of transport at Manila, P. I.

Hanner, John W., asst.-surgeon, relieved from duty as surgeon on transport *Sheridan* on its arrival at Manila, P. I., and to report to commanding general, Division of the Philippines, for assignment to duty.

Appel, Aaron H., surgeon, sick leave further extended three months on S. C. D.

Lando, M. E., asst.-surgeon, resignation as first lieutenant and asst.-surgeon took effect Feb. 1, 1904.

Burkart, John L., contract surgeon, ordered from Grand Rapids, Mich., to the Division of the Philippines. Will sail from San Francisco, March 1.

Patterson, Edwin W., contract surgeon, at the expiration of his leave of absence to return to the Division of the Philippines, sailing from San Francisco, March 1. His order for Fort Washington, Md., revoked.

MacDonald, Charles E., contract surgeon, ordered to proceed from his home at Jeffersonville, N. Y., to Fort Bliss, Texas, where he will arrive February 20, and accompany a battalion of the Twelfth Infantry to the Division of the Philippines.

Miller, William G., contract surgeon, ordered from his home at New Castle, Pa., to Holbrook, Ariz., there to join a portion of the Twelfth Infantry and accompany that regiment to the Philippine Islands.

Newton, Ralph W., contract surgeon, ordered from his home at Barre, Vt., to Price, Utah, where he will meet the companies of the Twelfth Infantry, now stationed at Fort Du Chesne, Utah, and accompany them to the Philippine Islands.

Trook, Edwin M., contract surgeon, ordered from his home at Marion, Ind., to Fort Douglas, Utah, where he will report for duty with the Twelfth Infantry, en route to duty in the Division of the Philippines.

Chambers, William H., contract dental surgeon, relieved from further duty in the Department of the East, and assigned to the Department of the Gulf.

Navy Changes.

Changes in the medical corps of the Navy, week ending February 6, 1904:

Strine, H. F., asst.-surgeon, detached from the Naval Station, Isabela, P. I., and ordered to the Navy Yard, Olongapo, P. I.

Grunwell, A. G., surgeon, granted sick leave for three months from February 2.

Heiner, R. G., asst.-surgeon, ordered to the Naval Hospital, New York.

Stoop, R. E., asst.-surgeon, ordered to the Naval Hospital, Norfolk, Va.

Spear, R., and Ship, E. M., surgeons, commissioned surgeons from March 3, 1903.

Morse, E. T., pharmacist, detached from the Naval Laboratory, and ordered to the Naval Station, Cavite, P. I.

Marine-Hospital Service.

Official list of the changes of station and duties of commissioned and non-commissioned officers of the Public Health and Marine Hospital Service, for the seven days ended February 4, 1904:

Warren, B. S., asst.-surgeon, granted leave of absence for seven days from February 12.

Foster, S. B., A. A. surgeon, Department letter granting leave of absence for ten days from Jan. 17, 1904, amended to read ten days from Jan. 21, 1904.

Maguire, E. S., pharmacist, relieved from duty at Fort Stanton, N. M., and directed to proceed to Mobile, Ala., and report to medical officer in command for duty and assignment to quarters, relieving Pharmacist J. E. Beck.

Beck, J. E., pharmacist, on being relieved from duty at Mobile, Ala., by Pharmacist E. S. Maguire, to proceed to Fort Stanton, N. M., and report to medical officer in command for duty and assignment to quarters.

Holt, E. M., pharmacist, granted leave of absence for twenty-seven days from January 1 on account of sickness.

Robinson, D. M., asst.-surgeon, commissioned as P. A. surgeon, to rank as such from Dec. 28, 1903.

Foster, William J., appointed A. A. surgeon at Lexington, Mich., for examination of keepers and surfmen of the Life-Saving Service.

Health Reports.

The following cases of smallpox, yellow fever, cholera and plague have been reported to the Surgeon General, Public Health and Marine Hospital Service, during the week ended Feb. 5, 1904:

SMALLPOX—UNITED STATES.

District of Columbia: Washington, Jan. 23-30, 1 case.
Florida: Jacksonville, Jan. 23-30, 4 cases.
Indiana: Evansville, Jan. 23-30, 2 cases.
Iowa: Des Moines, Jan. 23-29, 1 case.
Louisiana: New Orleans, Jan. 23-30, 2 cases, 1 case imported.
Maine: Orono, Jan. 22, 1 case.
Michigan: Jan. 23-30, Detroit, 1 case; Flint, 1 case; Grand Rapids, 2 cases.
Missouri: St. Louis, Jan. 23-30, 13 cases.
New Hampshire: Manchester, Jan. 23-30, 2 cases.
New Jersey: Camden, Jan. 23-30, 1 case, 1 death.
New York: Buffalo, Jan. 22-29, 1 case.
Ohio: Jan. 23-30, Bucyrus, 4 cases; Warren, 1 case.
Pennsylvania: Jan. 23-30, Allentown, 1 case; Erie, 1 case; Johnstown, 2 cases; McKeesport, 5 cases; Philadelphia, 65 cases, 17 deaths; Pittsburg, 15 cases, 1 case imported; Reading, Jan. 25-Feb. 1, 2 cases; Williamsport, Jan. 24-31, 1 case.
Utah: Salt Lake City, Jan. 23-30, 1 case.
Wisconsin: Milwaukee, Jan. 23-30, 3 cases.

SMALLPOX—FOREIGN.

Austria: Prague, Jan. 2-9, 5 cases.
Brazil: Rio de Janeiro, Dec. 27-Jan. 3, 41 cases, 27 deaths.
China: Shanghai, Dec. 21-29, 1 case, 1 death.
France: Paris, Dec. 26-Jan. 16, 50 cases, 3 deaths.
Great Britain: Jan. 8-16, Edinburgh, 9 cases; Leith, 1 death; Liverpool, 1 death; Manchester, 1 case; Newcastle-on-Tyne, 2 cases; Sunderland, 6 cases, 1 death; Glasgow, Jan. 15-22, 65 cases, 4 deaths; London, Jan. 2-16, 10 cases.
India: Bombay, Dec. 29-Jan. 5, 3 deaths; Karachi, Dec. 27-Jan. 3, 7 cases, 1 death.
Mexico: Tampico, Jan. 10-24, 11 cases.
Netherlands: Amsterdam, Jan. 8-16, 2 cases, 1 death.
Russia: Dec. 26-Jan. 2, Moscow, 5 cases; Odessa, 2 cases; St. Petersburg, Jan. 2-9, 24 cases, 1 death.
Spain: Santander, Jan. 10-17, 2 cases.

YELLOW FEVER.

Africa: Grand Bassam, Dec. 12, present.
Brazil: Rio de Janeiro, Dec. 28-Jan. 3, 2 cases.
Mexico: Vera Cruz, Jan. 16-23, 1 case.
Panama: Panama, Jan. 5-12, 3 deaths.
Venezuela: La Guaira, Jan. 2-9, present.

PLAGUE.

British Burmah: Rangoon, Dec. 9, 1 death.
China: Hongkong, Dec. 5-12, 1 case, 1 death.
India: Bombay, Dec. 29-Jan. 5, 125 deaths; Karachi, Dec. 27-Jan. 3, 7 deaths.
South Africa: Natal (Pietermaritzburg), Dec. 5, 3 cases, 2 deaths.

CHOLERA.

Straits Settlements: Singapore, Dec. 5-19, 3 deaths.
Turkey in Asia: Dec. 28-Jan. 4, Diarbekir, 15 deaths; Inobe, 1 case, 1 death; Latakiah, 11 cases, 7 deaths; Mossul, 1 case, 1 death; Mussieb, 18 cases, 18 deaths; Kerbela, Dec. 21-23, 15 deaths.

Medical Organization.

Indiana.

BENTON COUNTY MEDICAL SOCIETY.—This society was reorganized February 1, with the aid of Dr. George F. Keiper, Lafayette, councilor for the Tenth District, and the following officers were elected: President, Dr. Clark Cook, Fowler; vice-president, Dr. Samuel C. Fenton, Boswell, and secretary-treasurer, Dr. Carl N. McCaslin, Earl Park.

WHITE COUNTY MEDICAL SOCIETY.—Dr. George F. Keiper, Lafayette, councilor for the Tenth District, announces the reorganization of this society January 28. The following officers were elected: President, Dr. Robert J. Clark, Monticello; vice-president, Dr. James L. Carr, Monon; secretary, Dr. John H. Reed, Monticello; treasurer, Dr. Madison T. Didlake, and Dr. J. P. Cray, delegate to state society.

MIAMI COUNTY MEDICAL SOCIETY.—This society reorganized, September 25, and adopted the standard constitution and by-laws, and on January 29 the annual election was held, with the following result: President, Dr. Jared Spooner, Peru; vice-president, Dr. Ellis H. Andrews, Peru; secretary, Dr. John L. Tyler, Mexico, and treasurer, Dr. James O. Ward, Peru. By vote of the society the president-elect was instructed to cast the entire vote of the society at the next meeting for the board of censors and the delegates to the state meeting.

Mississippi.

NEWTON COUNTY MEDICAL ASSOCIATION.—This society held its first regular meeting at Decatur, January 12, at which it adopted the standard constitution and by-laws, and elected Drs. Clarence V. Gilmore, Hickory, M. Luther Camp, Chunkeys Station, and Albert G. Petty, Conehatta, censors; Drs. M. Luther Camp, Chunkeys Station, W. S. Norris, Stamper, and I. W. Cooper, committee on health and legislation, and Dr. W. S. Norris, Stamper, delegate to the state association.

Ohio.

HANCOCK COUNTY MEDICAL SOCIETY.—Dr. Frank D. Bain, Kenton, councilor for the Third District, met the members of this society at Findlay, January 21, and delivered an address on the benefits of reorganization on the standard plan. Dr. Myron J. Ewing presided, and Dr. John M. Firmin acted as secretary. A resolution to reorganize was adopted and a committee, consisting of Drs. John M. Firmin, Joseph P. Baker, and John C. Tritch, was appointed to draft a constitution and by-laws.

Society Proceedings.

MEDICAL SOCIETY OF THE STATE OF NEW YORK.

Ninety-Eighth Annual Meeting, held in Albany, Jan. 26-28, 1904.

(*Concluded from page 391.*)

One of the valuable features of the scientific sessions was the symposium on abdominal pain.

Abdominal Pain in General.

DR. JOHN H. MUSSER, Philadelphia, presented the opening paper. He said that while muscular rigidity or spasm was rightly held in high esteem as an indication of abdominal pain, certain precautions must be observed in interpreting this sign. In women, with relaxed and distended abdominal walls, there was not likely to be much muscular rigidity even in the presence of pain; also if there was much toxemia present. On the other hand, very muscular persons were apt to show this rigidity out of all proportion to the severity of the pain. The occurrence of rheumatism of the diaphragm and of diaphragmatic pleurisy should be kept in mind; also the fact that pneumonia, especially in children, might be confounded with appendicitis. Pyloric spasm and gastralgia were very apt to be mistaken for cholelithiasis. A sudden disappearance of pain was significant of the presence of a grave toxemia.

DR. JOSEPH D. BRYANT, New York, read a paper on "Abdominal Pain Referable to the Abdominal Walls." He said one should bear in mind the nerve distribution to the abdominal walls. An infection, localized in the abdominal wall itself, might be mistaken for intra-abdominal involvement.

Abdominal Pain of Intestinal Origin.

DR. FREDERICK HOLME WIGGIN, New York, said that, as a general rule, persistent and sharp abdominal pain pointed to peritonitis, and a dull, aching pain rather to involvement of the connective tissue. Tenesmus pointed to involvement of the lower third of the intestinal tract. If the colon were the offending part, there would usually be diarrhea, with a limitation of the pain and tenderness to the colon. The diagnosis of appendicitis should never be made until after disease of the chest had been excluded. In all cases of persistent and obscure abdominal pain exploratory operation should be done.

On the third day there was a symposium on nephritis.

Renal Decapsulation from the Pathologist's Point of View.

DR. J. M. VANCOTT, Brooklyn, concluded that decapsulation could only be injurious to the normal kidney, and of no benefit to the large white kidney.

Surgical Treatment of Nephritis.

DR. WILLIS G. MACDONALD, Albany, thought that in infectious nephritis arising from local bacterial infection by such organisms as the gonococcus and streptococcus, and in cases of acute suppression of urine following operations on the genito-urinary tract, surgical treatment was of value.

General Treatment of Nephritis.

DR. BEVERLEY ROBINSON, New York, treated in this paper only of acute and chronic diffuse nephritis. He said that, in the acute attacks, the patient should at once be placed in bed, clothed in woolen and surrounded by blankets, and given at first an almost exclusively milk diet. The kidneys should be relieved by rapidly emptying the bowel with salines, and by diaphoresis by the hot wet pack, which was simpler and safer than the hot water bath. Poultices over the kidneys to relieve the renal congestion, and high rectal irrigations of saline solution with Kemp's tube to promote diuresis, were useful. He looked on pilocarpin as a dangerous drug. If an attack of uremia were imminent, nitroglycerin or the sweet spirits of niter, and, in some instances, wet cupping or even venesection might be required. As the acute stage passed off, the dietary should be cautiously enlarged, and the pronounced anemia should be combated by the administration of the tincture of the chlorid of iron, or by Basham's mixture. The bowel and skin should be kept active, and excesses in eating or physical exercise carefully guarded against. The diarrhea of chronic Bright's disease was sometimes controlled by prolonged irrigation of the bowel. When there was so much anasarca that the skin became very tense, it might be necessary to puncture the skin, or even insert a capillary drainage tube. If dyspnea were marked, paracentesis of the pleura or abdomen might be demanded. Digitalis was often useful, but in persons past middle life, it was generally necessary to counteract its constricting action on the blood vessels by adding nitroglycerin. In chronic nephritis, one should be especially solicitous about the development of subacute attacks. The urine should be watched, and the diet and exercise regulated by the amount of albumin and the number and character of the casts found therein. Iodid of potassium was very prone to derange the stomach and impair the appetite. All irritant drugs, such as chlorate of potash, the salicylates and the phenol compounds should be used with caution. As a general rule, patients did better without alcoholics in any form, but there were exceptions, notably those who had been accustomed to small quantities daily for years. In nephritis and threatening or actually developed uremia, a good general rule was to give morphin only when the pupil showed a tendency to dilate; when the opposite condition obtained morphin was especially dangerous. For sleeplessness, bromids should be given.

Discussion on Nephritis.

DR. DELANCEY ROCHESTER, Buffalo, said that he had found it an easy matter, even in the humblest homes, to give the hot air bath, and, in his hands, it had proved exceedingly efficient. He did not use pilocarpin in large doses, but when given in minute doses, by hypodermic injection, and immediately followed by the hot air bath, he had found it useful in persons in whom it was not easy to excite free diaphoresis. As a guide to the management of chronic nephritis, it was just as important to determine from time to time the total excretory power of the kidney, as indicated by the total quantity of urea and of urinary solids, as it was to note the fluctuations in the albumin and casts.

DR. S. B. WARD, Albany, urged the use of arsenic in overcoming the anemia of nephritis.

Fifteen Years' Experience with Uterine Fibroids.

DR. W. E. FORD, Utica, presented an experience embracing 162 cases which had been kept under observation for a sufficient length of time. There were 96 cases treated by the galvanic current in the earlier years. In 7 of these there was a disappearance of both the symptoms and the tumor, and 26 cases had been greatly improved for a period of five years or more. Thirty-one cases were treated by curettage, ligation of the uterine arteries or by the administration of drugs. Of this number, 24 had been temporarily benefited. There were 61 operative cases, 34 by Baer's method. He did not think more than 20 per cent. of cases of fibroids required operation.

Results in Diffuse Septic Peritonitis Treated by the Elevated Head and Trunk Position.

DR. RUSSELL S. FOWLER, Brooklyn, reported about 80 cases treated by this postural method, and about one hundred cases altogether were operated on, no one being refused operation, no matter how desperate the outlook. Of the 33 deaths, 17 occurred in the first twenty-four hours, and these patients were profoundly septic at the time of operating. Sixty-seven patients recovered. The technic consisted in applying to all infected areas a mixture of equal parts of peroxid of hydrogen and soda solution, and following this with salt solution. The entire abdomen and pelvis were flushed with the saline solution, and a glass tube inserted into the pelvis. Immediately after the operation the bed was elevated at least one foot.

Other papers read were as follows:

"A Study of the Climate of Long Island," by Dr. W. H. Ross, Brentwood, Long Island, N. Y.; "The Submerged Tonsil," by Dr. Thomas J. Harris, New York; "Irritability of the Bladder in Women," by Dr. R. L. Dickinson, Brooklyn; "Tic Douloureux and Other Neuralgias from Intranasal and Excessive Accessory Sinus Pressures," by Dr. Sargent F. Snow, Syracuse, reporting 20 chronic cases, none of which required excision of the nerve, but all of which showed intranasal pressures or collections in the sinuses; "Enuresis," by Dr. George E. Beilby

of the State Industrial School at Rochester; "The Non-operative Treatment of Trachoma," by Dr. Frank J. Parker, New York, recommending vigorously rubbing the lids three times a week with a 1 to 500 bichlorid of mercury solution and having the patient at home drop into the eyes, night and morning, a solution of argyrol.

Therapeutics.

[Our readers are invited to send favorite prescriptions or outlines of treatment, such as have been tried and found useful, for publication in these columns. The writer's name must be attached, but it will be published or omitted as he may prefer. It is the aim of this department to aid the general practitioner by giving practical prescriptions and, in brief, methods of treatment for the diseases seen especially in every-day practice. Proper inquiries concerning general formulae and outlines of treatment are answered in these columns without allusion to inquirer.]

La Grippe.

In the general treatment of la grippe, Dr. D. R. Brower suggests that the patient be given the mild chlorid of mercury grains three to five (.20-.30) in divided doses, followed by a saline cathartic. To combat the infection, temperature and pain, he recommends the following combination:

℞. Salol
Quin. sulphatis
Acetanilidi, āā ..... gr. xx 1 | 30

M. Ft. cap. No. xx. Sig.: One every hour or two hours. The patient should be put to bed and placed on a light liquid diet.

When insomnia is present, as is the case quite frequently, he recommends the following:

℞. Trional 3iss 6

M. Ft. chart. No. vi. Sig.: One at bedtime, and repeat in one hour if necessary; or:

℞. Chloratis hydratis 3iss 6

M. Ft. chart. No. vi. Sig.: One powder at bedtime dissolved in half a glass of water.

The after-treatment should be carefully carried out in order to build up the physical condition as rapidly as possible. He notes in this connection the increase in suicides and tendency to kidney changes following epidemics of la grippe. He therefore recommends in these convalescent cases a mild alterative similar to the following:

℞. Auri et sodii chloridi ..... gr. iii-v | 20-.30
Pulv. res. guaiaci 3i 4

M. Ft. cap. No. xxx. Sig.: One capsule one-half hour before each meal, washed down with hot water.

In some cases the following is recommended:

℞. Ammon. brom. ..... gr. 3ii 8
Ammon. iodidi 3i 4
Ext. glycyrrhizæ flu. q. s. ad 3iii 90

M. Sig.: One teaspoonful every three hours.

As a hematinic he recommends the following:

℞. Ferri sulph. (exsic.)
Sodii carb., āā 3i 4
Ext. nucis vom ..... gr. vi | 30
Acidi arsenosi ..... gr. i | 06

M. Ft. cap. No. xxx. Sig.: One capsule three times a day after meals.

To relieve the laryngotracheal cough in influenza Yeo recommends the following combination containing apomorphin:

℞. Apomorphinæ hydrochlor. ..... gr. i | 06
Morphinæ hydrochlor. ..... gr. ¾ | 05
Acidi hydrochlor. dil. 3ss 2
Syrupi 3iv 15
Aquæ q. s. ad 3iv 120

M. Sig.: One or two teaspoonfuls at a dose and repeat as the individual case requires.

The following is also recommended to relieve the cough:

℞. Heroin hydrochlor. ..... gr. 1/24 | 0025
Terpin hydratis ..... gr. iiss | 15

M. Ft. pil. No. i. Sig.: One such pill at bedtime.

As an inhalation for the relief of the cough the following is of service:

℞. Glycerini
Spts. camphoræ, āā 3i 4
Tinct. benzoini 3ii 8
Spts. chloroformi ..... ʒss 15

M. Sig.: Thirty to sixty drops to be inhaled from a jug half full of hot water, two or three times daily.

The following, according to the author, is also valuable in relieving the cough:

℞. Liq. morph. hydrochlor.
Acidi hydrobrom. dil., āā 3i 4
Spts. chloroformi ..... m. iii | 20
Tinct. limonis 3i 4
Syrupi. q. s. ad ..... ʒiss 45

M. Sig.: One teaspoonful as indicated to relieve the cough.

In influenzal pneumonia the following is indicated:

℞. Ammonii carb. 3iv 15
Tinct. cinchonæ ..... ʒiss 45
Spts. ammon. arom. 3iv 15
Decoct. cinchonæ q. s. ad ..... ʒxii 360

M. Sig.: Two tablespoonfuls with a tablespoonful of lemon juice in effervescence every four hours.

Where there are pulmonary complications the following formula recommended by H. C. Wood will be of value:

℞. Ammon. chloridi 3ii 8
Apomorph. hydrochlor. ..... gr. i | 06
Mist. glycyrrhizæ comp. ..... ʒiss 45
Syrupi ..... ʒiss 45

M. Sig.: One dessertspoonful every two hours.

And if diarrhea occurs in the course of an influenzal attack he recommends the following combination:

℞. Bismuthi subnit. ..... gr. x | 65
Acidi carbol. ..... gr. iss | 09

M. Ft. cap. No. i. Sig.: One such capsule every two, three or four hours.

For the neuralgic pains in influenza Bardet, in *Clin Ther.*, recommends the following combination:

℞. Exalgin ..... gr. lxxv 5
Tinct. aurantii ..... m. lxxv 5
Syr. aurantii ..... ʒi 30
Aq. destil. q. s. ad ..... ʒv 150

M. By rubbing the tinctura aurantii and exalgin together, adding sufficient alcohol to dissolve, then add the syrup aurantii and water.

Sig.: One tablespoonful at a dose and repeat if necessary. [Exalgin is methyl-acetanilid.]

Pertussis.

The following combinations, recommended by *Jour. des Pract.*, are of value in the treatment of whooping cough:

℞. Pulv. belladonnæ rad. ..... gr. 1/20 | 003
Pulv. sacchari 3i 4

M. Ft. chart. No. viii. Sig.: Two powders daily; or:

℞. Atropinæ sulph. ..... gr. 1/100 | 0006
Aquæ destil. ..... ʒvi 180

M. Sig.: One dessertspoonful at a dose and repeat in three or four hours, watching the effects carefully; or:

℞. Bromoform. ..... m. xlviii 3 | 20
Alcoholis 3iiss 10
Aq. laurocerasi 3i 4
Aq. destil. ..... ʒiv 120

M. Sig.: One teaspoonful four times daily; or:

℞. Bromoform ..... m. xlviii 3 | 20
Olei amygdalæ dulcis
Pulv. acaciæ, āā ..... ʒss 15
Aq. laurocerasi 3i 4
Aq. destil. q. s. ad ..... ʒiv 120

M. Sig.: One teaspoonful three or four times daily.

[When administering bromoform the effects must be carefully watched on account of its tendency in some cases to produce depressing effects.]

Tapeworm in Children.

The following outline of treatment is of service as a vermifuge in children, according to an abstract in *N. Y. and Phila.*

Med. Jour.: Place the child on a milk diet for two days. The night before administering the vermifuge give a purgative enema of sodium sulphate. The following morning give:

R.	Oleores. aspidii	m. xxx-3iss	2.-6 |
	Hydrarg. chloridi mitis	gr. iii-viiss	20-.50 |
	Pulv. saccharo	3vi	24 |
	Gelatin q. s.		|

M. Sig.: To be given in four doses at intervals of half an hour. While the worm is being expelled, another purgative enema may be given, if the parasite threatens to break.

Subacute Gout.

The following combination is recommended by *The Pract.* in the treatment of subacute gout:

R.	Colchicin	gr. 1/60	0001 |
	Ext. nucis vom.	gr. 1/4	015 |
	Ext. gentianæ	gr. i	06 |

M. Ft. pil. No. i. Sig.: One such pill three times a day.

As a local application for gouty joints the following is recommended by Clemens in *Amer. Med.*:

R.	Sodii carb.	3iii	12 |
	Tinct. opii	3ii	60 |
	Linimenti bellad.	3ii	60 |
	Aquæ q. s. ad	3viii	240 |

M. Ft. linimentum. Sig.: Mix with equal parts of hot water and apply locally to the affected joint on a cloth and cover with oiled silk.

Medicolegal.

Medical Examiner's Decision not Final.—The Supreme Court of Nebraska holds, in C., B. & Q. R. R. Co. vs. Olson, that the decision of the medical examiner of the relief department of a railroad company that a member is "not entitled to any further disability benefits" is a mere conclusion, and is not binding on the parties.

Can Not Compel Witness to Exhibit Leg—Compensation.—In the case of McKnight vs. Detroit & Mackinac Ry. Co., brought to recover for medical and surgical services rendered to a number of persons injured in a train wreck, one of those treated was called as a witness for the railway company and asked to exhibit his leg to the jury. This he declined to do, and the trial court refused to compel him to do so. The Supreme Court of Michigan holds that this ruling was correct. It distinguishes this case from one where the question was whether a party to an action could be required to submit her arm at the point of an alleged fracture, where such exhibition would cause no shock to the sense of delicacy, in which the decision was rested on the ground that, where a person appeals for justice, he impliedly agrees in advance to make any disclosure that may be necessary to be made in order that justice may be done. It says that this witness occupied no such relation to the cause, and objected to exhibiting his leg, and the Circuit Court correctly ruled that he had the right to so object. It was requested that the jury be instructed, in effect, that there were no amounts agreed on with the railway company for the services performed or to be performed, and that, if it was liable at all for any professional services rendered, it was liable only in such an amount as would be reasonable and fair under all the circumstances; that the party suing had not the right to fix an arbitrary fee, nor could any number of physicians agree on a fee to be charged. They were entitled to receive, if anything, what their professional services were worth in the community in which they rendered them, and no more. The circuit judge charged the jury, in substance, that, in estimating the value of the physician's services, they should consider the professional skill and the experience of the physician, the nature and character of the services rendered, the difficulties and the nature of the case, and the amount of services rendered, and clearly limited the recovery to such a sum as, on the evidence, the jury should find would compensate the party suing for services rendered in this case. The Supreme Court thinks this sufficiently covered all that the company by its request had the right to have given to the jury. It says that it necessarily excluded the fact that an arbitrary fee might be fixed by the party suing or by any number of physicians; and, had the request been given, it might have led the jury to believe that the purpose was to discredit the testimony of the witnesses for the party suing who were physicians, and who had substantially agreed as to the value of his services. Another physician, who was called as a witness for the company, having testified that he, too, had attended a number of victims of the wreck, the Supreme Court holds that there was no error in excluding evidence of what he received for his services. It says that he was permitted to testify fully as to the reasonableness of the charges of the party suing, and evidence of what he received for the services he rendered would have opened the question as to how his services compared with those of the party suing, and would have involved the trial of an additional case.

Liability for X-Ray Burn—Competent Witnesses.—The Supreme Court of Minnesota holds, in Henslin vs. Wheaton and others, that, in an action against a physician and surgeon for negligence and unskillfulness in applying to the body of the party suing the device known as "Roentgen's X-rays" for the purpose of locating a foreign substance thought to be in his lungs, the rule of liability is the same as that applied in other actions for malpractice, and one of ordinary care and prudence. It says that this was the first case to come before it involving alleged negligence on the part of physicians in applying the recently-discovered *x*-rays, and that no rule of care in such cases had been laid down. But there can be no doubt that the rule applicable to the care and skill required of physicians toward their patients in other cases applies. That rule was stated in Martin vs. Courtney, 87 Minn. 197, in the following language: "The legal obligation of the physician to his patient, where his conduct is questioned in an action of this character, demands of him no more than the exercise of such reasonable care and skill as is usually given by physicians and surgeons in good standing." The rule is one of ordinary care and prudence, and the question presented in this *x*-ray case was whether the evidence received and that offered on the trial tended to show a failure on the part of the parties sued to exercise such care. The party suing testified that the exposure of his person to the *x*-rays was made for too long a period of time, and that the tube or bulb through which the rays are generated was placed too close to his body. He testified to the number of times the *x*-rays were applied, and the length of time—from thirty to forty minutes on each occasion—and that the tube of the apparatus was placed within two inches of his person in each instance, except one. He then called as an expert witness one whose testimony, if received, would have tended to show unskillfulness and negligence on the part of the parties sued. The foundation was fully laid for his opinion as an expert touching the questions involved in the case. But he was not a physician and surgeon, and the parties sued raised the objection that he was incompetent to testify against them, under the rule announced in the case of Martin vs. Courtney, 75 Minn. 255, where it was held that, in an action against a physician or surgeon for malpractice—unskillfulness in treatment being charged—the physician was entitled to have the propriety of his treatment tested by physicians of the same school. The trial court applied that rule to this case, and in doing so the Supreme Court is of the opinion that it erred. The Supreme Court says that the application of the *x*-ray to the party suing was not for the purpose of treating any disease or ailment from which he suffered, but for the purpose of locating, if possible, a foreign substance thought to be in his lungs (the gold crown of one of his teeth, which he thought he had inhaled). While it, perhaps, may in some instances be used as a remedial agent, it was not so employed in this case. The so-called *x*-rays, discovered by Roentgen, have been recognized and known to scientists, both in and out of the medical profession, for some eight years. During this time the apparatus for the generation of the *x*-rays, together with the fluoroscope, has been used very generally by electricians, professors of physics, skiagraphers, physicians, and others for

experimental and demonstrative purposes. It is a scientific and mechanical appliance, the operation of which is the same in the hands of the college professor, or the physician of the allopathic, homeopathic, or any other school of medicine. It may be applied by any person possessing the requisite scientific knowledge of its properties, and there would seem to be no reason why its application to the human body may not be explained by any person who understands it. The rule in the Courtney case could therefore have no application to the case at bar. It might apply, did it appear that the application of the *x*-rays to the person of the party suing was for medical purposes, and not for the scientific purpose of discovering the presence of a foreign substance in his lungs. Wherefore, a physician who applies the *x*-rays, not for medical purposes, but to locate a foreign substance in the body of his patient, is not entitled to have the question of his care and skill in applying it determined by the opinions of physicians of his own school.

Current Medical Literature.

AMERICAN.

Titles marked with an asterisk (*) are abstracted below.

American Medicine, Philadelphia.

January 30.

1 *The Diagnosis and Treatment of Gallstones. Max J. Stern.
2 *The Medicolegal Aspects of Autoabortion. Charles G. Cumston.
3 *Postoperative Intestinal Obstruction. A. M. Pond.
4 *Some Features of the Epileptic Attack. B. Onuf.
5 Some Reflex Neuroses of Dental Origin. William J. Lederer.
6 *Intrauterine Flushing and Drainage for Infection; the Passing of the Curette and Douche. Horace G. Wetherill.
7 The Relationship Existing Between the Ophthalmologist, Otologist and the General Hospital. Frank Allport.

1. **Gallstones.**—Stern remarks on the sudden appearance of pain, the difficulties of differential diagnosis, especially from appendicitis when the appendix points upward, and from right-sided floating kidney. As regards the appendix it is fortunate that the same treatment is required for both the conditions. In floating kidney the most important point in the differential diagnosis, according to Kehr, is the sensation which is experienced with the reposition of the floating kidney. It darts upward and backward with a flop, and is liable to remain in its new position, while the gall bladder constantly returns to its place close to the anterior wall of the abdomen. No error should ever occur in cholelithiasis when a tumor exists in the right hypochondrium whose form and movement are inherent to a distended gall bladder. Jaundice is one of the least frequent symptoms, and is probably a disease of the individual liver cell communicated by extension of an inflammatory invasion from the biliary passages or some affection of the liver *per se*, unaccompanied by obstruction. Adhesions or kinks may produce symptoms in a patient who has already passed the stone. Stern gives a classification in detail of some 12 different types of gallstone disease. He remarks that the persistent latent stage is, of course, the best cure compatible with the existence of gallstones. There are two methods of procedure: to produce a stage of quiescence and latency, and operation. No solvent is known, and there is no remedy that will drive stones from the bladder. It is an unquestionable fact that, with the faithful use of hot laxative waters, the circulation of the liver, portal system and entire abdomen is improved, especially where the patient has been living an idle, luxurious life. Riedel says that 95 per cent. of all gallstone disease passes into the latent stage, and only 5 per cent. calls for operation. It should be the last resort. Stern says the physician can call himself a good diagnostician when he is able to differentiate between hydrops and empyema of the gall bladder, and acute seropurulent cholecystitis, and when he can determine whether a chain of symptoms is dependent on obstruction by stone or due to pressure by a tumor. This skill should be possessed by every practitioner.

2. **Auto-Abortion.**—Cumston discusses the possibility of auto-abortion, and thinks that it is comparatively common and is much more practicable than has been alleged by the text-books. He gives his reasons for this belief in detail.

3. **Postoperative Intestinal Obstruction.**—Pond classifies postoperative intestinal obstruction as due to, 1, impairment of the physiologic function; 2, pathologic processes such as inflammation; 3, mechanical obstruction due to adhesion, adventitious bands, omental rents, accidents to the sutured wall and the presence of foreign bodies. Byford's plan of giving a mild laxative before the anesthesia is good. It will not act as a cathartic, but as a general intestinal tonic and stimulant, and in the vast majority of cases is most gratifying in its action, preventing impaction and inertia of the bowel. The temptation is great to be too energetic, however, in attempts to produce peristalsis. Obstruction due to lowered resistance can in a great measure, like paresis, be avoided by carefully conducting the operative procedures, avoiding hemorrhage, etc., and much of the tonicity can be restored by filling the abdomen with a hot solution of adrenalin chlorid in decinormal salt solution in the proportion of 1 to 1,000, which increases the intestinal blood pressure very markedly and stimulates intestinal peristalsis. Intestinal atony, due to predisposing causes, is the most obstinate form. The impairment due to pathologic process is most commonly met with in acute inflammatory involvement of the intestinal coats. When the process involves all the tunics the condition is exaggerated and cathartics must be withheld; the impaired intestine must have rest. If tenesmus be present the large bowel is involved, and the use of oxygen gas will relieve the circulatory stasis, and re-establish peristalsis. If the trouble is in the small intestine withhold all food and drink by the mouth and feed per rectum predigested food. Tympany and distension can often be controlled by gastric lavage as often as the patient needs it. Acute septic peritonitis may be caused by obstruction of the bowel from the absorption of septic material, and better results have been obtained by a high enema containing magnesium sulphate and turpentine than by evacuants administered by the mouth. The treatment of postoperative obstruction, of course, depends on its cause. An enema, medicated or plain, is the best first resort. If it does not prove effectual the application of the cautery over the abdomen should be tried. The use of catharties is dubious, but rest does much in this condition. Atropin is said to act as a sedative, relieving the stasis. In mechanical obstruction the only thing to do is to operate, the earlier the better.

4.—See abstract in THE JOURNAL, xli, p. 1224.

6.—Ibid., p. 1290.

New York Medical Journal.

January 30.

8 *Inaugural Address, Medical Society of the State of New York. Algernon T. Bristow.
9 Case of Purulent Pericarditis Secondary to Pneumonia, with Operation and Recovery. J. A. Scott.
10 *Solitary, or Fused Kidney, with Report of a Case. Warren A. Dennis.
11 *Some Investigations of a Bacterial Treatment of Tuberculosis. (Concluded.) Stephen J. Maher.
12 *Public Health and Food Preservatives. (Concluded.) R. G. Eccles.

8.—See abstract in THE JOURNAL, Feb. 6, p. 389.

10. **Fused Kidney.**—The various types of fused kidney are noted by Dennis, who reports a case and sums up the data in regard to the subject as follows:

1. According to available statistics, complete absence or extreme atrophy of one kidney is found once in 2,650 cases; horseshoe kidney once in 1,000 cases; and the fused kidney, exclusive of the horseshoe variety, once in about 16,000 cases.
2. The great majority of fused kidneys are misplaced, being usually in the median line and lower than normal.
3. The completely fused kidney, with normal position and approximately normal outline, is the rarest form of all.
4. Cystoscopic examination, with catheterization of the ureters, will prevent the error of removing the only organ present in all cases, except those of fusion.
5. Horseshoe and irregularly fused kidneys may be recognized on exposure by their abnormal shape or position, or by both.
6. The single remaining and rarest variety, that with normal outline and position, can probably always be at least suspected and left, if the ureter and pelvis are found shifted to the anterior surface.

11. **Tuberculosis.**—Maher reports here further experiments with his antitubercle X bacillus on rabbits previously inoculated with the tubercle bacillus and the results, and also discusses rather briefly other experiences in regard to the antagonistic action of other germs on the tubercle microbe. He says,

in substance, that he would like to emphasize the following points: The X bacillus can be injected alive and in pure culture into the human system. 2. After its injection it remains alive in the human body often for weeks, and does no other harm than occasionally, for obscure reasons, causing slight suppuration at the point of injection. 3. After its injection it causes a variable febrile reaction, never serious, and which probably varies in intensity according to the amount of its enzymes that are injected with the bacillus or according to the amount of material it finds to feed on. 4. After its injection, it has been found in the urine and blood and sputa of persons injected. 5. After injection into the groins of persons suffering from tuberculosis there is often a subjective sense of local reaction at the site of the tuberculous lesion. 6. After its injection into the connective tissue about tuberculous *fistulæ in ano*, a marked improvement, even to closure of the fistula, has followed. 7. After its injection into the ear of persons suffering from tuberculosis otitis media no harm has ensued, but in several instances a cure has followed. 8. After its application on gauze or cotton packing to sinuses leading from carious bone, supposedly tuberculous, such sinuses and caries have healed with surprising promptness. 9. Its hypodermic injection into patients suffering from lung tuberculosis has been followed in many instances by marked relief of cough, fever, night sweats, wasting, anorexia, diarrhea and hemorrhage. 10. Its instillation into the open tuberculous pleural cavity has caused the drying up of a purulent discharge that was resistant to ordinary methods. 11. Its hypodermic injection into consumptive patients has in several demonstrable cases been followed by the apparent cure of the disease. 12. As a valuable scavenger of the tuberculous human system, the X bacillus claims the interest of the medical profession for the further reasons that it grows in acid or alkaline media, that its product is alkaline, that it grows in the presence or absence of air, that it feeds only on dead matter, that it grows more quickly and has more vitality than the ordinary pus-producing germs, and reduces their number markedly after its introduction into the human system. 13. Some as yet incomplete investigations would seem to show that this X bacillus is not without beneficial effect on other than tuberculous invasion. While he thinks that many of his statements need further confirmation by better bacteriologists, and that probably some of them may fail of such confirmation, still he thought it was time to call the attention of the profession to his subject.

12. **Food Preservatives.**—Eccles further argues against the existence of the alleged dangers of salicylic acid. He quotes authorities showing that its presence in food products in quantities required for their preservation is likely to be innocuous, and assumes that the probable reason for its having such a slight effect is its rapid elimination. He also goes at length into the economic advantages of the use of salicylic acid as a food preservative.

Boston Medical and Surgical Journal.

January 28.

13 *Experiments with the McGraw Elastic Ligature. Fred T. Murphy.
14 *Differential Diagnosis of Rheumatism and Arthritis. Thomas F. Harrington.

13. **The McGraw Elastic Ligature.**—Murphy gives the history of this method, crediting its earliest use to Gaston. McGraw brought out his results independently in 1891, and his communication has since been followed by various clinical and experimental confirmations of his claims. Murphy reports experiments which show that a successful anastomosis between the stomach and intestine or between two loops of the intestine is possible by this means, but it is not applicable when an immediate opening is required. The time of cut-out varies, depending on the character of the ligature, the method of application, and the resistance of the tissues in any case, but ultimately the ligature will cut out. A knot at either end of the elastic loop increases the rapidity of its action, and the penetrating of the gut by the ligature seems to cause no bad symptoms. The serous surface on the outside of the joint when completed is smooth. The anastomosis, by gross or microscopic examination, shows no evidence why there should be any greater tendency to contraction of the opening than with the ordinary methods of intestinal suture. The operative risk is minimized both as regards shock and infection. Adhesions across the opening are possible, but rare. Murphy concludes that in cases where immediate opening of the bowel is not imperative, and where the avoidance of operative shock is an important factor, the ligature may prove to be the operation of choice in gastro-enterostomy and lateral anastomosis. The article is profusely illustrated.

14. **Rheumatism and Arthritis.**—Harrington classifies the various forms of arthritis into seven species: infective deformans, osteo-arthritis, traumatic, gouty, hemophilic and senile. The diagnosis is discussed at length. Arthritis deformans is considered a good descriptive term, and is credited to some nerve disturbance for its origin. The form described by English observers as acute rheumatoid arthritis confounds acute rheumatism and arthritis deformans more than any other affection. Osteo-arthritis may start from any cause or have no ascertainable cause. The condition is a chronic one, usually affects the large joints, often unilateral, more common in men, especially old men, and tends to the enlargement of bony, not cartilaginous matter as in arthritis deformans. Any manipulation of the joint is liable to break off some of the osteophytes, while in arthritis deformans there is a false ankylosis amenable to proper manipulation. The form of osteo-arthritis occurring in the spine—spondylitis—he thinks is more common than supposed, and may produce peripheral paralysis, rarely equal on the two sides. In traumatic arthritis the history is important. Gouty arthritis has the gouty characteristics of sudden onset, and the presence of deposits in the ear, while it usually attacks single small joints. Hemophilic arthritis should be kept in mind, especially in surgical cases. It does not seem to be due to trauma, and usually occurs between the fourth and sixth years, most often in the male, generally affecting the knee and elbow. The mortality among hemophilics having arthritis is less than among the others. In senile arthritis there is a thickening of the capsule, but not of the bones; it has no relation to rheumatism, and is more stiffness than soreness. It does not involve the heart, and grows better as the day progresses.

Medical Record, New York.

January 30.

15 *The Movement of Plague in the Philippine Islands. E. L. Munson.
16 Report of a Case of Brain Tumor Involving the Right Lateral Ventricle. William M. Leszensky.
17 *Contribution to Obersteiner-Redlich Theory of Tabes Dorsalis. G. B. Hassin.
18 *An Antiseptic Toilet for the Hands and Vulva. Douglas H. Stewart.
19 *Instruments for the Production of Abortion Sold in the Market Places of Paris. Frederic Griffith.
20 Scarlatinal Panotitis; Exfoliation of a Portion of the Labyrinth; Radical Operation. Carl Koller.
21 An Unusual Case of Potassium Iodid Idiosyncrasy. Henry Gathmann.

15. **Plague in Manila.**—Plague in the Philippines seems to have effected a lodgement only in Manila, and is there largely confined to the Chinese population. Munson gives statistics of, from Jan. 1, 1900, to Sept. 1, 1903, 970 cases with 812 deaths—a mortality of 83.8 per cent. Certain districts of the city seem to be almost free from it, owing to the local conditions. The mortality was decidedly less among Americans than among other classes, Europeans surpassing them in this respect. The Chinese are ahead of the Filipinos who, however, furnished a considerable proportion of cases, although but a small percentage of their total population. The disease is about six times as likely to occur in males as females, though among the Filipinos more women than men suffer. The methods of meeting the conditions are described, and seem to be very efficient. Protective inoculation has also been employed of late and demonstrated its advantages.

17. **Tabes.**—Hassin reviews the theories of tabes, showing that several of the more recent ones, such as those of Marie and Nageotte, point to the theory of Obersteiner-Redlich, which he adopts, namely, that the membranes of the cord are involved and the columnar lesion is secondary.

18. **Antiseptic Toilet.**—Stewart maintains that chlorin is the best hand disinfectant known, and gives the results of numerous culture experiments after its use. The fluid he recommends is in use in the New York Polyclinic Hospital and the City Hospital. The method used is five minutes' mechanical cleansing with powdered pumice stone, sterile hot water, green soap and wooden nail cleaners, followed by five minutes' chemical cleansing with two heaping teaspoonsfuls of fresh 35 per cent. calx chlorata and 1 teaspoonful of U. S. P. (36 per cent.) acetic acid to a pint of sterile water. If this stands for ten minutes without stirring, the necessary chemical changes are complete. He himself omits the green soap, and proceeds as follows: He takes one teaspoonful each of lime and one of powdered pumice stone on a saucer with wooden nail cleaners. He has further a basin with two quarts of "cool" water mixed with one teaspoonful each of calx chlorata, of table salt, aqua ammoniæ and carbonate of potassium. In this basin is a nail brush. He dips his hands in this solution, takes the wooden nail cleaner and applies the pumice under and around the nails. If he can not get them speckless, he then dips the wet ends into the chlorid on the saucer. He avoids getting lime on the sensitive skin, but he works it under the finger nails with the stick and with the pumice so that it gets into every possible crevice. Then he scrubs his hands, including nails, in the solution with the brush. This is the five-minute mechanical preliminary, followed by the chemical as above described. He finds that in many cases the mechanical treatment leaves the hands sterile without the subsequent chemical treatment. Clinical experience has shown that the solution originally recommended was unnecessarily strong, and he suggests the use of one teaspoonful of acetic acid and 2 of lime to the pint of sterile water. For sterilizing the vulva he uses a one-third strength, as also for compresses on sterile wounds.

19. **Abortion Instruments.**—Griffith relates his discovery of the peddling of instruments for abortion in Paris, and describes and illustrates the instruments. It would seem that local physicians knew very little about it.

Medical News, New York.

January 30.

22 *Criminal Procedure Against the Unlawful Practice of Medicine. Julius M. Mayer.
23 *A New Method for Performing Intestinal Anastomosis. John W. Keefe.
24 A Fatal Case of Chorea Complicated by Endocarditis, Pericarditis and Nephritis. Augustus A. Eshner.
25 *Notes on the Widal Reaction: 1. The Question of Dilution. 2. The Influence of Jaundice. E. Libman.
26 *A Brief Note on the X-ray Treatment of Glandular Tuberculosis. Frank P. Vale.

22. **Irregular Practitioners.**—The essentials for the successful prosecution of illegal practitioners are, according to Mayer, the definition of the practice of medicine, abolition of minimum punishments and the devising of some method whereby all advertisements of irregular practitioners can be eliminated from the newspapers that are published in the state.

23. **Intestinal Anastomosis.**—The method here described by Keefe begins by severing the to-be-resected portion of the intestine from the remainder by the electrothermic angiotribe, and cutting through the desiccated strips left by the angiotribe. The desiccated ends are then united with a modified and an interrupted Lembert suture. He gives the details, and asserts that the results are immediate hemostasis, perfect asepsis, no intestinal obstruction, no eversion of mucous membrane, little danger of cicatricial stenosis, a firm strong union, and rapid operation. He has operated on dogs by this method, but in only one human case. In this the postmortem showed good union.

25. **The Widal Reaction.**—Libman has examined 1,500 cases of fever, 550 of which were typhoid. In the 950 non-typhoid cases the Widal reaction was never reported positive even with a dilution of 1 to 20. While it is possible that there were some cases of paracolon infection in the 550 cases, and the agglutination at a dilution of 1 to 20 may have been simply a group-agglutination, the mistake is not a serious one, for to the clinician a case of paratyphoid fever is to be considered and handled, at least for the present, as one of typhoid. He asks why we use the dilution of 1 to 50 when we get such reliable results with 1 to 20. He has been surprised to find in some cases a positive result with the weaker dilution while it was either negative or not clearly positive with the stronger one. He thinks this is explainable by the fact that in the dilution of 1 to 20 the lytic action of the serum is so marked that one can not obtain a clear picture, and he thinks that in performing the agglutination test it is best to use both strengths, the 1 to 20 and 1 to 50, and it is even possible that the 1 to 100 or even higher dilutions may be positive when the lower ones are negative. The second point mentioned is the reaction in icterus cases. He has made a number of experiments with the bile and serum of jaundice patients with the result that he finds nothing to convince him that jaundice *per se* can cause the positive Widal reaction. All that can be said is that while icteric serum may at times be possessed of a certain amount of agglutinating power, there is at present no definite proof that it can produce sufficient agglutination to interfere with the clinical diagnosis.

26. **X-Ray Treatment of Glandular Tuberculosis.**—Vale finds but little literature on this subject. The most satisfactory statements are in Pusey and Caldwell's work where five cases are reported with marked reduction in the size of the glands. In one, complete disappearance occurred. He reports a case where strikingly good results followed *x*-ray treatment. At present the patient is practically well. Encouraged by the results, he used it in one other case where the lungs were affected secondary to tuberculous processes in the cervical glands. The lungs were improved at the Saranac Sanitarium, but the glands had increased in size. Their removal had been thought of, but advised against for fear of bringing the tuberculous process in the lungs into renewed activity. During the short period of treatment of two weeks, they diminished appreciably in size, and a few weeks later the patient wrote that they were hardly half as large as before.

Cincinnati Lancet-Clinic.

January 30.

27 Primary Lateral Sclerosis. F. W. Langdon.
28 *Macewen's Method in Amputation of the Hip. H. D. Hinckley.
29 Nasal Polypus. Dudley S. Reynolds.

28. **Amputation at the Hip-Joint.**—Of the various methods Hinckley prefers the Macewen method. The assistant, standing on the left side, places his right closed fist on the abdomen of the patient so that his first knuckle touches the upper and left border of the umbilicus. He then presses downward and toward the median line, compressing the aorta just above its bifurcation against the spinal column. If of short stature, he should stand on a stool so that he can bring his whole weight on the abdomen. This cuts off all the circulation of the affected part so that no instrumental equipment is required. The means are always at hand, and the assistant is out of the way of the operator and his other assistants. It is easy to determine the effectiveness of the compression by feeling the pulse in the common femoral of the sound side. Finally, the field of operation being unincumbered, the surgeon can operate as rapidly as he is able and form his flaps to suit his case. The embarrassment of respiration which has been given as an objection to the procedure is too temporary to be of serious import, but there may be some difficulty in obese patients. Hinckley reports a case in which this method was employed, without the loss of a drop of arterial blood, with perfect success.

St. Louis Medical Review.

January 30.

30 Carcinoma Uteri. John C. Murphy.

American Practitioner and News, Louisville.

October 15.

31 Treatment of Asthma and Tuberculosis by the Intravenous Use of the Fralick Fluid. Frank C. Wilson.
32 Treatment of Malarial Fever. T. Atchison Fraser.
33 Tetanus in Newborn Infants. R. B. Gilbert.
34 *Transmissibility of Diseases of Animals to Animals of Other Species. Geo. T. McWhorter.

34. **Animal Diseases.**—McWhorter discusses anthrax, glanders, hydrophobia, swine plague, tuberculosis and the bites of

venomous serpents. He concludes that the evidence shows that certain diseases of animals are transmitted from species to species without diminution of virulence. Animal life being considered cheap, the source of infection in these cases is soon eradicated and the total of human fatalities from it is not great. Other diseases of animals, such as vaccinia, are often communicated to man, mild in character and protective in influence, as are certain human diseases communicated to animals. A number of diseases of animals are transmissible to other species only with the utmost difficulty or not at all, and the parasitic carriers of the disease may be able to infect only that species from which they receive infection. Species is a great and but little understood factor in the distribution of disease. Heterolysis rather than autolysis or isolysis must be largely relied on in immunization.

Occidental Medical Times, San Francisco.

January.

35 *Considerations Relative to Gastric Surgery: A Plea for Early Accurate Diagnosis. T. W. Huntington.
36 *The Treatment of Chronic Heart and Arterial Diseases by Means of Baths and Gymnastics. Josef I. Manson.
37 A Case of Hodgkin's Disease with Relapsing Fever. J. O. Hirschfelder and W. R. P. Clarke.
38 Immediate Repair of the Lacerated Perineum. Henry J. Kreutzmann.
39 A Case of Molluscum Fibrosum. George B. Somers.

35. **Gastric Surgery.**—The point made by Huntington in regard to pyloric insufficiency, gastric hemorrhage, etc., is that in any case with obscure and persistent symptoms, a diagnostic incision should be asked for and insisted on before the patient is run down and when there is reasonable hope of recovery from the section, the anesthetic and the surgical shock. Recurrent hemorrhages from the stomach that are of sufficient magnitude and frequency to interfere with the patient's general well-being can be relieved by proper drainage of the ulcerated stomach. By the same means the stomach can be relieved from the distressing consequences of non-malignant pyloric obstruction. He believes the time is not far off when the value of modern teaching regarding malignancy of the stomach will find expression in the uncovering of an incipient malignant nodule by means of a diagnostic incision and giving a chance of relief by surgical methods; that the diagnostic incision is thoroughly legitimate and an accredited procedure. It should be resorted to with the same freedom that is exercised in dealing with the stomach contents in the laboratory.

36. **Heart Disease.**—Manson describes the Nauheim methods in detail with illustrative cases.

Archives of Pediatrics, New York.

January.

40 *Lumbar Puncture in (*a*) Otitis Serous Meningitis; (*b*) Cerebrospinal Form of Typhoid Fever, and (*c*) Cerebrospinal Meningitis. Francis Huber.
41 *Abscess of the Lung Following Acute Pneumonia. A Report of Two Cases. L. Emmett Holt.
42 *Some Cases of Infantile Nephritis. F. M. Fry and Charles F. Martin.
43 *Streptococcus Diarrhea in San Francisco. (Streptococcus Gastroenteritis.) Sanford Blum.

40. **Lumbar Puncture.**—Huber reports the effects of lumbar puncture in three separate conditions, in all with good results. His opinion of the therapeutic value of the operation is strengthened by these cases.

41. **Post-Pneumonic Lung Abscess.**—Two cases are reported by Holt, operated on by aspiration. Each case followed an acute pneumonia, the abscess being recognized about two and a half months after the attack. In the first case the child was under constant observation. In the other the history of the onset was definite. In both pneumococci were present in the pus, in one case associated with the staphylococcus. In neither were any tubercle bacilli found. The indications were that the abscess had been shut off from the bronchi by inflammation; otherwise there would have been more evidence of a mixed infection. No pus was coughed up either before or after the operation. The diagnosis of the condition is discussed, showing that the physical signs are not very characteristic, but other symptoms, such as continued fever and high leucocytosis, may aid in the diagnosis. From tuberculosis, differential diagnosis may be difficult and sometimes impossible without prolonged observation, but we should remember that abscess most frequently follows acute pneumonia; that the patient may have been previously in the best of health without any exposure to tuberculosis. Wasting is a less frequent symptom, and the absence of tubercle bacilli in the sputum, aspirating pus and the presence of pneumococci assist in the recognition. The treatment in the case reported was simple. As the pleural cavity is generally obliterated by dense adhesions, as in both these cases, incision into the lung can generally be made with little risk.

42. **Infantile Nephritis.**—Fry and Martin have examined 100 infants under three months of age as regards the urine. Albumin was present in 19 cases, and 17 had also casts, hyaline and granular. Out of 100 he found that 31 altogether had casts, 14 without albumin. Of these 31, 22 were bottle-fed and 9 breast-fed. Uric acid was present in 26 cases, 14 of them with albumin and casts. Of the 12 remaining, 10 had either albumin or casts. It would seem that where uric acid was in abundance only a very few—that is, 3—escaped some evidence of nephritis or renal irritation. Of these 26, 19 died. Autopsies were obtained on 7. In each of these there was uric acid infarcts and parenchymatous nephritis. Section showed degeneration of the convoluted tubules. In 3 of the cases there was also acute interstitial nephritis. There were 6 others that gave clinical evidence of nephritis. It would appear that marasmus was not the sole cause of the nephritis, but the marked increase of uric acid would indicate a possible association between the nephritis and marasmus.

43. **Streptococcus Gastro-enteritis.**—Blum describes cases observed by him in San Francisco during the hot season with symptoms of constipation followed by diarrhea, stools characterized by mucus and blood having a foul odor, fever of the remittent type, and general prostration. The cases were obstinate, but finally recovered under treatment with calomel, salol, bismuth and tannigen. A diet devoid of milk seemed to be better in these cases than when milk was given. Castor oil was administered at intervals of four or five days. There was evidence of infectiousness in one of the cases where the disease seemed to spread in the family. In all the cases where cultures were made streptococci were present, but in only one instance was it found in pure culture. He discusses the literature of the subject, and remarks that the diagnosis can only be made positive with the microscope. Bacillary gastro-enteritis is usually a severe disease, and while Booker classifies streptococcus infection as the most virulent form, it is of interest to note that all these cases, though severer than the ordinary diarrheal disturbances, ran a comparatively benign course.

American Gynecology, Baltimore.

December.

44 *The Results of the Roentgen Method in the Diagnosis of Renal Calculus. Charles Lester Leonard.
45 Puerperal Eclampsia—Report of Cases, One of Which Was Treated by Cesarean Section. R. E. Skeel.
46 Vaginal Cystotomy for Stone in the Bladder. Charles E. Robins.
47 A Case of Condyloma Acuminata in an Infant. Richard R. Smith.
48 *Toxemia of Pregnancy. William S. Stone.

44. **Renal Calculus.**—Leonard illustrates the accuracy of the Roentgen rays in the diagnosis of renal calculus, and claims that the method is imperative in all suspicious cases. In any apparent attack of renal calculus no course of treatment can be undertaken without the determination of the presence or absence of stone, and the Roentgen rays should be used before every nephrolithotomy or ureterolithotomy to determine whether or not operation is necessary, and to localize and limit the operation itself, as well as to make it comprehensive and complete.

48. **The Toxemia of Pregnancy.**—Stone's principal topic is the hyperemesis of pregnancy which he attributes to a general toxemia. He classifies toxemia as mild and severe, and divides the latter into acute and subacute. The subacute includes those appearing in the early months, which after a duration of four to seven weeks terminate fatally or end in recovery; and a smaller proportion that also appear early but continue

throughout pregnancy with intervals of improvement, though likely to develop very serious conditions and even to be fatal. Of the acute types there are: 1, Cases of pernicious vomiting ending fatally in two weeks; 2, cases which, with or without previous manifestations of a mild character, suddenly become completely prostrated and die within a few hours; and 3, cases ordinarily described as eclampsia. He points to the difficulty of recognizing certain urinary changes until more improved methods of technic are generally available. The treatment on the hysterical theory is analogous to treatment of cancer by Eddyism. The drugs that are useful are few, such as calomel, salol, etc., and the absolute abstinence from either food or drink until improvement has commenced. Nutritive enemata, as well as stomach lavage, may sometimes be employed. The chief reliance, however, should be placed on injections of hot normal saline solution into the rectum at frequent intervals, according to the Behm method; it may be necessary to add half an ounce of whisky to some of the injections. In some cases it may even be advisable to employ continuous irrigation for half an hour every three or four hours, using the double current rectal tube or two separate tubes. Occasionally hypodermoclysis may have good effect. He would say that pregnancy ought to be interrupted before the appearance of black vomit or rise in the pulse or urinary changes. In the acute or fulminating type he thinks the matter of intervention is open to the most serious doubt.

Pennsylvania Medical Journal, Pittsburg.

January.

49 Address in Neurology, Medical Society of the State of Pennsylvania. Chas. B. Mayberry.
50 X-ray, Light and High Frequency Electricity. Russell H. Boggs.
51 Utility of X-ray for the Treatment of Chronic and Malignant Diseases of the Skin and Superficial Tissues. Samuel H. Heller.
52 The Roentgen Rays as a Palliative in the Treatment of Cancer. Charles L. Leonard.
53 *The Roentgen Rays in Therapeutics. Mihran K. Kassabian.
54 Some Problems in Surgery. G. D. Nutt.
55 *Proctocolitis, with Special Reference to Treatment. William M. Beach.
56 A Fatal Case of Chorea Complicated by Endocarditis, Pericarditis and Nephritis. Augustus A. Eshner.
57 Four Cases of Malignant Disease of the Lungs. J. C. Lange.

53. **The X-Rays.**—Kassabian classifies the results of his observations as to the effects of the *x*-rays in malignant disease as follows: 1. Class where total failure results as far as cure is concerned. 2. Class where there has been decided improvement of symptoms, alleviation of the pain from the beginning, disappearance of induration and edema, decrease in the size of the enlarged glands, the ulcerating surfaces taking on a healthy appearance, etc. 3. Cases that are totally and permanently cured; this class is small. Cases coming under this category are sarcoma, external carcinoma and epithelioma. Rodent ulcer requires the least trouble and the fewest applications. So far he has cured 16 cases without a single recurrence. It is not possible to say that recurrences will not occur, but four years have elapsed in eight or nine cases without any signs. Among other cures are cases of malignant tumor of the skin (proved by microscopic examination), of the mammary glands, and of those located in easily accessible cavities. He has had less result in curing sarcomata than carcinomata, though he has had 3 cases that have been absolutely cured. As long as a case is operable he would recommend removal of the growth, and when recurrence is noted, repeated application of the *x*-rays. Lupus vulgaris is amenable in 95 per cent. of cases, according to his experience.

55. **Proctocolitis.**—Beach sums up his points in regard to this disorder in the following:

1. Proctocolitis is a disease that attacks old and young. My experience and records show it to be more general in the male sex. 2. The essential symptoms are pain, constipation and membranes. 3. In diagnosis, appendicitis, malignant and pelvic diseases are to be eliminated. 4. Reflex symptoms must be recognized when they occur, as neuralgia, lithemia, vertigo, dyspepsia, cardiac irritation, asthma and neurasthenia. 5. The history of acute dysentery of bacillary origin and the neuroarthritic diathesis must be reckoned with as casual factors. 6. Ptosis of the abdominal viscera, appendicitis and tumors may be complications in severe cases. 7. The diet should consist, for the most part, of soft foods, eliminating green vegetables, fruits, fats and alcohol. Milk is the standard aliment. 8. Certain medicines are of use as indicated, but should be selected and used with great care. 9. With the above regimen the most efficient procedure is to wash out the colon.

Texas Medical Journal, Austin.

January.

58 *The Controlling Influence of Environment in Epidemic Infectious Diseases. J. W. McLaughlin.
59 The Differential Diagnosis Between Yellow Fever, Dengue Fever, Malarial Fever and Acute Yellow Atrophy of the Liver. F. Paschal.
60 Appendicitis—Some Remarks on Its Pathology, Diagnosis and Treatment. F. L. Barnes.

58. **Environment in Infectious Disease.**—M'Laughlin holds that the pathogenicity of micro-organisms is not a constant, invariable quantity, but differs directly with their capacity to manufacture disease-producing substances—toxins and toxalbumins. The capacity to manufacture toxins is affected by certain natural and artificial agencies. We call such a change in the micro-organism an attenuation. These agencies are unfavorable culture media, or are conditions of life in which the germs are compelled to exist. Sunlight is a powerful, natural attenuating agent, and he thinks we are justified in believing that there are other natural means of modifying the types of epidemics. Cleanliness in the home, in the municipality, pure air, drainage, temperature, humidity, etc., are often important factors.

Pediatrics, New York.

November.

61 *An Easy Method of Percentage Infant Feeding. C. W. M. Brown.
62 *Conclusions from Fifty-one Intubated Fatal Cases of Laryngeal Diphtheria. B. R. Shurly.
63 Effects and Treatment of Adenoids. H. M. DeJarnette.

61. **Percentage Infant Feeding.**—Brown advises Townsend's method, published in the *Boston Medical and Surgical Journal* of March 25, 1899, as one of the simplest methods, that is, the decanting off of the upper one-fourth of milk from the total, which contains 10 per cent. of fat, with 4 per cent. proteids and 4 per cent. sugar. With 10 per cent. cream it is evident that one ounce of cream in a 20-ounce mixture would give a percentage of 1-20 of 10 per cent. or one-half of 1 per cent. of fat. In the same way the percentage of albuminoids would be 1/20 of 4 per cent., or .2 of 1 per cent., and the sugar would be .2 of 1 per cent. One more fact is needed before formulating the rule for human modification, that is, that an even tablespoonful of sugar of milk weighs 3.5 drams and each tablespoonful added to a 20-ounce mixture raises the percentage of sugar 2 per cent. It may be added that each tablespoonful of cane sugar, which may sometimes be used, raises it 3 per cent. The rule to be remembered is that each ounce of 10 per cent. cream in a 20-ounce mixture represents .5 of 1 per cent. of fat; .2 of albuminoids and .2 of sugar; and each even tablespoonful of sugar of milk represents 2 per cent. Thus if we order top milk 4 oz., water 15 oz., lime water 1 oz., sugar of milk, 2 tablespoonfuls, we are making a formula of fat 2 per cent., sugar 4.8 per cent., and albumin .8 per cent. If we order 8 ounces of top milk, 11 ounces of water, 1 of lime water and 2.5 tablespoonfuls of milk, we are making a formula of fat 4, sugar 6.60, and so on. He quotes Holt's summary of the most important indications for varying the percentages; if not gaining in weight and with no special signs of indigestion, increase the proportions of all ingredients; if habitual colic, diminish the proteids; for frequent vomiting soon after feeding, reduce the quantity; for regurgitation of sour masses of food reduce the fat and sometimes the sugar. For obstinate constipation increase both fats and proteids. Brown ends his article with the following conclusions:

1. The modification of cow's milk for infant feeding may safely be done at home under the care of the mother or nurse of ordinary intelligence, and is preferable to guess work. 2. It is based on the known composition of mother's milk, and also on the known dissimilarities between it and cow's milk, especially in the proteids. 3. The method of home modification and of calculating the percentages should and can be made extremely simple, and such modifications can be made sufficiently accurate and uniform. 4. The addition of cereals to the milk in the form of barley or oatmeal water is generally desirable after the seventh month, and is desirable before that age in some cases as an aid to the digestibility of the milk.

62. **Laryngeal Diphtheria.**—Shurly considers intubation the best practice in the hospital, though tracheotomy may be advisable outside, but he insists on the extreme importance of the early administration of large doses of antitoxin and the immunization of those exposed.

Medical and Surgical Monitor, Indianapolis.

January 15.

64 Our Health and Medical Laws, and Legislation that Is Needed. William L. Taylor.
65 General Paresis—The History, Definition and Etiology. A. W. Brayton.
66 Hemorrhagic Diseases of the New-born. G. H. Grant.
67 *Comparison of Measures for Rescue of Mother and Child in Placenta Previa. Walker Schell.
68 *The Mouth and Its Care in the Syphilitic. C. Travis Drennen.
69 *Typhoid Gangrene of the Extremities. B. Merrill Ricketts.

67. **Placenta Previa.**—Schell thinks that in placenta previa, even in the worst cases, cesarean section may offer the child his only chance. The total of infant mortality under other methods is estimated by various authorities as about 50 per cent. This sacrifice of infant life should be avoided. A hastily-performed version is more dangerous than the ordinary operation of cesarean section to both mother and child. In many of these cases rapid extraction is essential for the safety of both, and it is often difficult, frequently causing the death of the child and perilous to the mother. If cesarean section is done early, before there has been considerable hemorrhage in the early stages of labor, it can be a fairly elective operation, and as favorable to recovery as under any other circumstance. If there is considerable hemorrhage, rapid section offers the best hope of recovery. All delay except that necessary for the preparing of the abdomen for the incision is avoided, and the risk of hemorrhage attending operations on the placenta is also avoided.

68. The Care of the Mouth in Syphilis.—Drennen has during the past seven years been in the habit of urging every syphilitic to consult a dentist, and that after every meal it is necessary for him to brush his teeth carefully. If bleeding results so much the better; it relieves the engorgement. If the gums are tender and have a tendency to bleed early, he relieves it by applying alcohol once daily. If the local application of cocain is necessary for this it should be used. Ptyalism may nevertheless result from the necessary mercurial treatment, but if the patient, when finished with brushing the teeth, will take his finger and thumb and carry out a systematic massage of the gums for several minutes, not less than half a dozen times a day or oftener, there need be no fear of ptyalism. During the seven years while giving ungt. hydrarg. in doses ranging from half a dram to two-thirds of an ounce daily, externally, sometimes for weeks at a time, not a single well-developed case of ptyalism has come under his observation.

69.—This article has appeared elsewhere. See THE JOURNAL of January 23, ¶57, p. 270.

Medical Sentinel, Portland, Ore.

January.

70 The Medical and Dietary Treatment of the Various Types of Nephritis. C. J. Smith.
71 Notes and Reminiscences of a Year's Work in the Principal Surgical Cities of the East and Europe. David H. Rand.
72 Some Common Diseases of the Eye. M. A. Hughes.
73 Osteomyelitis, with Report of an Unusual Case. J. S. Courtney.

Central States Medical Magazine, Anderson, Ind.

January.

74 Report of Two Cases of Urethral Obstruction and Vesical Calculi. J. A. Sutcliffe.
75 Mercurial and Iodin Injection Treatment for Syphilis. Louis E. Schmidt.
76 Examination of Tubercular Sputum and Its Importance. John T. Scott.

Therapeutic Gazette, Detroit.

January 15.

77 Treatment of Remittent and Intermittent Fevers. Seale Harris.
78 Ibid. William Krauss.
79 Ibid. J. B. McElroy.
80 Few Remedies Other than Quinin in the Treatment of Malaria. M. Goltman.
81 Treatment of Malarial Fever. H. A. West.
82 Substitutes for Quinin in the Treatment of Malarial Fever. John T. Moore.
83 Treatment of Malarial Hemoglobinuria with Quinin. J. W. McLaughlin.
84 Use of Quinin in Malarial Hemoglobinuria. W. Shropshire.
85 Treatment of Malaria in Children. S. C. Red.

Journal of the Association of Military Surgeons, Carlisle, Pa.

February.

86 The Differential Diagnosis of Typhoid Fever in Its Earliest Stages. Frederick Smith.
87 Report of an Epidemic of Diphtheria on Board the United States Steamship Buffalo. George Edwin H. Harmon.
88 Typhoid and Malarial Fevers at Chickamauga in 1898. Edward C. Carter.
89 A New Galloping Ambulance Known as "The Rapid Transit Ambulance." Leonard Avery.
90 The Value of Statistics in Connection with Venereal Diseases in Army and Navy. Valery Havard.

Physician and Surgeon, Detroit and Ann Arbor.

November.

91 Etiology and Treatment of Headaches. Henry R. Niles.
92 Some Laws in Medicine. Ephraim Cutter.
93 The Great Western Clinics. Dunsmoor and Dunn at Minneapolis; the Mayos at Rochester. Hal C. Wyman.
94 A Case of Resuscitation After Freezing. John R. Bailey.

Colorado Medical Journal, Denver.

November.

95 Formalin Treatment of Laryngeal Tuberculosis. Lorenzo B. Lockard.
96 Shock, General Nervous and Surgical. Geo. C. Stemen.
97 Technic of the Operation for Inguinal Hernia Under Cocain Anesthesia. Orville M. Clay.

St. Louis Courier of Medicine.

January.

98 The Regions of the Abdomen from the Surgeon's Standpoint. Arthur E. Hertzler.
99 A Case of Gravidic Cardiac Thrombosis. A. Derivaux.

Merck's Archives, New York.

January.

100 Relationship of Chemical Structure to Pharmacological Action. Frank S. Meara.
101 Cimicifuga Racemosa. W. H. Blake.
102 An Index of Diseases Alphabetically Arranged, with Their Modern Treatment. G. Bjorkman.

Proceedings of the Pathological Society of Philadelphia.

November.

103 The Present Conception of Dermoid Cysts of the Ovary, with the Report of a Case of Teratoma Strumosum Thyreoideale Ovarii. Brooke M. Anspach.
104 Primary Carcinoma of the Vermiform Appendix, and the Report of a Case. Charles C. Norris.
105 Aneurism of the Aorta. John M. Swan.
106 Aneurism of the Arch of the Aorta, with Rupture. S. M. Hamill.
107 A Case of Cerebral Abscess. George C. Stout.

Western Medical Review, Lincoln.

January 15.

108 Further Experience in the Use of the X-ray in Malignant Disease. John P. Lord.
109 Mycotic Disease of the Ear Canal; with Report of a New Fungus. S. E. Cook.
110 The Blood. M. P. Overholser.
111 Some Problems in Preventive Medicine in Nebraska. S. R. Towne.
112 Operations on the Tonsil; Technic and Indications. Henry B. Lemere.
113 Vicarious Menstruation. W. J. Hemphill.

Interstate Medical Journal, St. Louis.

January.

114 *Internal Medicine. Jesse S. Myer.
115 *Surgery. Willard Bartlett.
116 *Therapeutics. Albert E. Taussig.
117 *Pathology and Bacteriology. Carl Fisch.
118 *Gynecology and Obstetrics. Hugo Ehrenfest.
119 *Pediatrics. Alfred Friedlander.
120 *Orthopedics. Malvern B. Clopton.
121 *Neurology. Sidney I. Schwab.
122 *Genito-urinary Surgery. H. McC. Johnson.
123 *Dermatology and Syphilis. Martin F. Engman.
124 *Laryngology and Otology. William E. Sauer.
125 *Ophthalmology. John Green, Jr.

114-125.—This issue is devoted to a review of medical progress for the year 1903, the various branches of medicine being divided up as indicated in the titles. Each writer gives an excellent résumé of what has been added to medical knowledge in his department and the whole number is thus made a very valuable one.

FOREIGN.

Titles marked with an asterisk (*) are abstracted below. Clinical lectures, single case reports and trials of new drugs and artificial foods are omitted unless of exceptional general interest.

Bulletin de l'Académie de Médecine, Paris.

1 (LXVIII, No. 1.) *Note sur l'alimentation des enfants. P. Budin and P. Planchon.
2 (No. 2.) Décollements traumatiques des epiphyses et fractures juxtaepiphysaires, au point de vue expérimental. Cornil and D. Coudray.

1. **Infant Feeding.**—Budin's "baby consultations" have been mentioned several times in these columns. The mothers who are delivered at the Clinique Tarnier are required to bring

their infants back to be examined once a week, and 712 have thus been followed for a month to two years. Fully 107 have been seen thus nearly every week for two years. Fridays, at a certain hour, the mothers, who mostly live in the neighborhood, bring in their babies. The children are hastily inspected to see that there is no eruption or false membrane, and then with more leisure each is examined in turn, the weight and other details recorded on a card kept by the mother. The card bears the ideal curve, and beside it the curve of the infant, with, in blue pencil, the amounts of milk it has taken and, with red pencil, the amount of gruel. There is much emulation among the mothers, and this constant weekly oversight has prevented the loss of a single infant from gastro-intestinal trouble, while the infantile mortality from this cause outside was 6.9 per cent. The total mortality among the entire 712 has been 3.65 per cent.; it includes 10 deaths from pulmonary affections, 5 from measles and 2 from pertussis, 5 from meningitis and 1 from congenital syphilis, 26 in all. The necessity for a supplement to the mother's milk is indicated by the weight. The children are not allowed anything but milk and milk gruels until the second year is concluded. As a general rule the child is given an amount of milk during the twenty-four hours corresponding to one-tenth of its weight—no more, as overfeeding entails digestive troubles which it is the aim of the consultations to avoid. The findings in 129 cases are tabulated, with some of the particulars. Big bellies, obesity, rachitis and eczema are not seen among the children that frequent these consultations. The great difficulty is to retain the women who are able to nurse their infants abundantly. They gradually drop out of the consultations, and to maintain their interest small prizes, baby clothes, etc., are given from time to time. Milk is supplied free daily. Budin inspects the babe, comparing it with the card, and does not have to devote more than a minute to each, on an average.

Presse Médicale, Paris.

3 (XI, No. 2.) Sur l'hématologie. F. Bezançon and M. Labbé.
4 Causeries électriques. M. Lermoyez.
5 La radiothérapie dans les cancers. L. Lavastine.
6 (No. 3.) Du traitement du mal de Bright par la décapsulation rénale, d'après G. Edebohls de New York. P. Cavaillon and P. Trillat.
7 Gymnastique ou massage en thérapeutique. Saquet.
8 (No. 4.) Les consultations de nourrissons (of nurslings). Guérin Valmale.
9 (No. 5.) Hydrogen Dioxid in Glossophytia. Papon.—L'eau oxygénée dans le traitement de la langue villeuse. Abstract.
10 Administration de la gélatine dans les diarrhées infantiles. Weill. Abstract.
11 *L'origine digestive du rheumatisme articulaire aigu. A. Gilbert and P. Lereboullet.
12 Appareil utillsant la force élastique du caoutchouc pour injections hypodermiques. J. Dupaigne.

11. **Digestive Origin of Acute Articular Rheumatism.**—Gilbert and Lereboullet entitle their monograph a "Study of the Diathesis of Auto-infection." They state that the entrance of infection in acute articular rheumatism by way of the throat is a fact established beyond question for a certain number of cases, but that there are others in which all the evidence points to a digestive origin. It is especially frequent in the subjects inclined to "biliousness." Bouchard noted it 28 times in 100 cases of biliary lithiasis, and 16 times in 100 cases of diabetes. The portal of entry in these cases is the bowel, liver, pancreas or appendix. In many persons the digestive tract is chronically infected, owing to a special predisposition to auto-infection. The most common symptom of this "auto-infection diathesis" is what they call "family cholemia." Acute articular rheumatism is in many cases the remote consequence of some infectious process in the digestive tract or its annexes. The altered walls become permeable for germs which pass then into the blood and settle in the joints. The infection does not affect the exterior, and hence it is not contagious, notwithstanding its infectious character. There is no eruption nor desquamation, no expectoration nor diarrhea made to entail infection of others. The efficacy of sodium salicylate is another argument in favor of this view as it is also one of the most efficient remedies for biliary infection. The causal agents of both affections are probably identical, and hence respond to the same treatment.

Revue de Chirurgie, Paris.

Last indexed page 206.

13 (XXIV, No. 1.) *Sur un cas de fibromyome de l'uterus avec généralisation viscérale. Leiomyome Malin. E. Devic and L. Gallavardin (Lyons).
14 Quelques remarques sur les kystes dentifères. Charles Greene Cumston (Boston).
15 *L'actinomycose de l'oreille. A. Rivière and L. Thevenot.
16 Note sur un cancer de l'estomac simulant l'ulcère. X. Delore and R. Leriche.
17 Fractures de la cavité cotyloide par enfoncement. M. Guibé.
18 *L'amputation osteoplastique de jambe à lambeau postérieur (of leg with posterior flap). P. Duval.
19 Hypertrophie congénitale des orteils (hallomégalie). H. Caubet and S. Mercade.
20 *Des fibromes du cordon spermatique. A. Bruneau and H. Condo de Satriano (Marseilles).

13. **Fibromyoma of Uterus with Visceral Generalization.**—Devic and Gallavardin have been unable to find records of more than a very few instances of malignant leiomyomata in the uterus. Since their communication on the subject in 1901 they have had occasion to observe a case with necropsy. The apparent fibromyoma presented the structure of malignant leiomyoma involving the rectum, with generalization in the peritoneum, liver, diaphragm and lungs. The patient was a woman of 55, otherwise healthy, who had suffered for seven months with lumbar and abdominal pains and four recurrences of what seemed to be menstrual bleedings, although the menopause had occurred five years before. The aspect under the microscope differed slightly from that of the cutaneous leiomyoma whose history they have previously published. Among other differences was the lack of giant-cell formation, while there was a light fibrillar stroma interposed between the fibrous cells.

15. **Actinomycosis of the Ear.**—Rivière's patient recovered completely after extirpation of the actinomycotic lesions, but in 2 other cases he has found in the literature the process spread and soon invaded the meninges. The middle ear was involved in both. He thinks that the middle ear was probably invaded from the pharynx by way of the eustachian tube, as the conditions do not favor primary lodgment of the germ. Surgical intervention should be prompt and thorough in case of accessible actinomycosis of the ear, but the prognosis must be guarded.

18. **Osteoplastic Amputation of the Leg.**—Duval combined the posterior flap with Bier's method of osteoplastic covering for the stump of one or both bones. Radiograms of four cases thus treated, taken several months to more than two years afterward, show the fine results attained. He sutured the plate of bone to the peroneus with wire in 2 cases, and the cuts indicate ideal conditions.

20. **Fibroma of Spermatic Cord.**—Bruneau adds a seventh to the six cases of this affection on record. It is difficult to differentiate it, and in case it springs from inside the inguinal canal it is impossible to tell it from a hernia. The fibroma does not recur after extirpation. In the one case of recurrence on record no microscopic examination was made, and the tumor may have undergone malignant degeneration.

Semaine Médicale, Paris.

21 (XXIV, No. 2.) De l'origine sensorielle de la déviation conjuguée des yeux avec rotation de la tête chez les hémiplégiques. L. Bard (Geneva).
22 *L'hystérotomie exploratrice. F. Lejars.

22. **Exploratory Hysterotomy.**—Lejars comments on the necessity for direct inspection of the inner surface of the uterus in puzzling cases of hemorrhagic metritis. Discovery by this means of some unsuspected fibroma or polyp will clear up the diagnosis and make it possible to cure the morbid condition with a trifling operation. The cervix is drawn down as for a vaginal hysterectomy, and is incised on the anterior median line which avoids vessels and bleeding. The incision must be carried beyond the internal os to expose the interior of the uterus. Bastian, Schwartz, Gannat and Dartigues have all recently mentioned the great value of this simple and harmless little operation as a routine measure in puzzling cases. The exploratory incision is always sutured at once.

Berliner klinische Wochenschrift, Berlin.

Last indexed XLI, page 1505.

23 (No. 46.) *Zur dietetischen Brom-Behandlung der Epilepsie. R. Meyer (St. Blasien).

24 Beitrag zur myasthenischen Paralyse. L. Mohr (Frankfurt).
25 *Zur Präventiv-Behandlung des syphilitischen Primar-Affektes. E. Hollaender (Berlin).
26 Ueber urtikarielles Oedem. B. Loewenheim (Liegnitz).
27 (No. 47.) Eumydrin, ein neues Mydriatikum. Lindenmeyer.
28 *Psychiatrie und Seitenkettentheorie (and side-chain theory). W. Alter (Leubus).
29 Ueber die Bedeutung des Heroins als Anaphrodisiakum. P. F. Becker (Berlin).
30 Prevention of Disturbances in Delivery After Vaginofixation. A. Dührssen (Berlin). (Commenced in No. 46.)
31 *Treatment of Pulmonary Tuberculosis with Sanosin. M. Behr (Hölsterhausen).—Zur Behandlung der Lungentub. und über die Anwendung des R. Schneider'schen Sanosin nach Danelius und Sommerfeld. (Commenced in No. 46.)
32 (No. 48.) Zur Frage der Sigmoiditis acuta. G. Edlefsen (Hamburg).
33 Zur Methodik der Rectoscopie. H. Strauss (Berlin).
34 Akute primäre Pyelitis der Säuglinge (of nurslings). M. Hartwig (Buffalo).
35 Experiences in Surgery of Stomach. F. Krause (Berlin).—Erfahrungen in der Magenchirurgie.
36 Antituberkulose-Serum und -Vakzine. A. Marmorek (Paris).
37 (No. 49.) *Serum Treatment of Articular Rheumatism. A. Schmidt (Dresden).—Ueber die Behandlung des Gelenkrheumatismus mit Menzerschem Antistreptokokkus-Serum.
38 *Cryoscopy in Kidney Testing. W. Zangemeister.—Ueber Verwertung der Gefrierpunktserniedrigung des Harnes zur Beurteilung der Nierenfunktion.
39 Vaginale oder abdominale Operation bei gynäkologischen Erkrankungen. K. Abel (Berlin).
40 Spasm of the Vocal Cords in Children. A. Japha (Berlin).—Ueber den Stimmritzenkrampf der Kinder.
41 Ueber Darm-Tumoren in der Gegend der Regio iliaca sin. C. A. Ewald (Berlin).

23. **Salt Starvation Treatment of Epilepsy.**—Meyer's experience with 4 epileptics treated by deprival of salt and administration of bromin in the bread, was quite favorable on the whole. The seizures were less numerous and less severe during this dietetic treatment, but on its suspension they seemed to recur as previously. Bromin acne was observed in all the patients, showing that the action of the drug is intensified on this régime.

25. **Preventive Treatment of Primary Syphilitic Lesion.**—Hollaender states that cauterization without contact transforms the specific lesion into a pure granulating lesion which then heals. The difference in the reaction to this cauterization on the part of ulcus molle and of the specific ulcus serves to differentiate them. It is possible in certain cases to prevent secondary manifestations by applying this measure in time, as he has had occasion to establish in his experience with 80 cases thus treated. The cauterization without contact is with a jet of superheated air.

28. **Psychiatry and the Side-Chain Theory.**—Alter thinks that exogenous or autochthonous toxins are responsible for the seizures in epilepsy, paralysis and certain hysteric conditions, and that their action is explainable by the side-chain theory. Treatment should aim to divert these toxins into the excreta.

31. **Experiences with Sanosin.**—Behr found that sanosin had a favorable action on tuberculous subjects by increasing the appetite, but no other benefit from its use was apparent in his experience.

37. **Antistreptococcus Serum in Articular Rheumatism.**—Schmidt tried Menzer's serum in 15 cases. Six were unmistakably improved; 4 only subjectively improved and in 5 no effect was apparent. The more pronounced the reaction the better the results observed.

38. **Cryoscopy of Urine.**—Zangemeister advocates the practice of diluting the urine for functional test by the freezing-point. He shows that this ensures more accurate results and is valuable for comparison. The urine is diluted always to the same volume of fluid for equal periods of time.

Deutsche medicinische Wochenschrift, Berlin and Leipsic.

42 (XXX, No. 3.) *Die neutrophilen Leukozyten bei Infektions-Krankheiten. J. Arneth. (Commenced in No. 2.)
43 *Ueber die physiologische Wirkung der Radium-Strahlen und ihre therapeutische Verwendung. W. Scholtz (Pfeiffer's Institute, Königsberg).
44 *Permanent Cures After Operative Treatment of Traumatic Jacksonian Epilepsy. G. Engelhardt (Poppert's clinic, Giessen).—Zur Frage der Dauerheilung, etc.
45 Construction of Small Hospitals. F. O. Kuhn (architect).—Die Bauart kleinerer Krankenhäuser. (Commenced in No. 2.)

42. **Neutrophile Leucocytes in Infectious Diseases.**—Arneth has a large work ready for the press on this subject. He proclaims that all our previous conceptions of the positive and negative chemotaxis for the neutrophile leucocytes has been based on false premises. Our assumption of the importance and meaning of hyperleucocytosis and hypoleucocytosis has been absurdly false. The explanation of the phenomena observed is the destruction of the neutrophile leucocytes which occurs in varying proportions according to the degree of infection or intoxication, the resisting powers of the organism and numerous other factors. In this preliminary communication he reports the most important findings of his research on the leucocytes. It has been conducted by a new technic, which commences where all other methods of investigation stop. It has revealed that the number of the leucocytes is no criterion as to their actual normal or abnormal condition. This depends on the condition of the nucleus. According to the characteristics of the nucleus the leucocytes may be divided into five classes. He has coined a new term to express these conditions, "cytosis," or "Zytose" in the Germaan, and distinguishes between isocytosis, anisocytosis, hypercytosis, hypocytosis and normocytosis. The condition in infectious diseases is always an aniso-hypercytosis (iso and aniso are the Greek terms for equal and unequal). Our present classification of leucocytes is shown by this new technic to be arbitrary and mistaken, while the new findings reveal much simpler and more regular relations between the various forms of white corpuscles. The new findings indicate that the neutrophile leucocytes are the producers of the antibodies, but not exclusively. Arneth does not describe his technic in this preliminary communication, but intimates that it is destined to throw light on many other of the finer physiologic and pathologic processes. He is assistant at von Leube's clinic at Würzburg, and his book is now in press at G. Fischer's, Jena.

43. **Radium Rays in Therapeutics.**—Scholtz mentions that the radio-active properties of radium are not affected by heating it to white heat or melting, nor by reducing its temperature to 252 C. below zero. He has been testing 25 mg of radium bromid in the treatment of various skin affections and tumors and conducting experiments on animals. The treatment proved particularly effective in lupus and superficial cancer. The results indicate that the radium rays produce effects closely similar to those of the *x*-rays, in some respects resembling those of concentrated light. Even if they accomplish no more than the other methods of radiotherapy, the far greater convenience of their application ensures them a wide field of usefulness. The radium can be easily introduced into the mouth, nose, throat and vagina. It may prove possible to bury a particle of radium in deep-seated tumors. A particle might also be introduced into the maxillary or frontal sinus to produce an effect on tissues below, or into the joints. Such procedures must, of course, first be tried on animals, but the prospects are promising for their application to man.

44. **Remote Results of Operative Treatment of Jacksonian Epilepsy.**—Two cases of traumatic jacksonian epilepsy were reported in 1896 as cured by an operation five years before. They have figured since in statistics as successes. Engelhardt now states that one of the patients has been cured to date, twelve years since the intervention, but in the other case, after an interval of rare seizures for three years and nearly two years of complete freedom from them, they then recurred, and in less than two years the patient was driven to suicide by their severity and frequency.

Münchener med. Wochenschrift, Munich.

46 (LI, No. 2.) Disseminated Fat-Necrosis. C. Hart (Dresden).—Die multiple Fettgewebsnekrose.
47 *Influence of Salt on Gastric Digestion. M. Bönniger.—Einfluss des Kochsalzes auf die Magenverdauung.
48 Hemolyse durch Blut-Plasma und Blut-Serum. G. Bellei.
49 Die ultra-microscopische Untersuchung nach H. Siedentopf und R. Zsigmondy und ihre Anwendung zur Beobachtung lebender Microorganismen. E. Raehlmann.
50 *Trials of Arm-Raising Method of Determining Pressure in Right Auricle. O. Prym (Bonn).—Zur Messung des Drucks im rechten Vorhof nach Gärtner.
51 Fall von Indigurie mit Auftreten von Indigo-Roth im frisch gelassenen Harn. A. Gröber (Leipsic).
52 Zum Katheterismus posterior. P. Glaessner (Halle).
53 Importance for Urethral Injections of Separation Between Anterior and Posterior Urethra. T. Lucke (Magdeburg).—Die Bedeutung des Abschlusses der hinteren Harnröhre gegen die vordere für die Praxis der urethralen Injektionen.
54 Ueber den histologischen und kulturellen Nachweis der Typhus Bazillen im Blut und in Leichen-Organe. E. Fraenkel (Hamburg).

55 *Treatment of Gastric Ulcer. M. Wagner (Hamburg).—Zur Behandlung des Magengeschwürs.

47. **Influence of Salt on Gastric Secretions.**—Bönniger's experiments were made on a dog with a Pawlow fistula. They demonstrated that salt has a marked inhibiting action on the secretion of gastric juice, confirmed by tests on a healthy human subject.

50. **Arm-Raising Test of Pressure in Right Auricle.**—Gaertner's new test was described in THE JOURNAL recently, page 68. Prym has been experimenting with it and states that it does not have the absolute significance which Gaertner attributes to it. Different veins collapse at different levels when the arm is passively raised, even on the same subject. The level is not determined alone by the pressure in the right auricle, but also by the elasticity of the veins, the resistance to the flow of blood and its greater or less viscosity, etc.

55. **Treatment of Gastric Ulcer.**—Wagner remarks that the aim of treatment of gastric ulcer in Lenhartz' service is always to abolish the hyperchlorhydria and likewise the anemia or chlorosis or other constitutional cause of debility, which is an almost invariable accompaniment of gastric ulcer and prevents its healing. For this reason the patients are put on a diet of concentrated albumin. This mode of treatment relieves the pains, and recovery is much more rapid and complete than with other methods of "ulcer cures." He gives the particulars of 60 cases thus treated, in all of which there had been more or less bleeding from the stomach. The patient is required to stay still in bed for four weeks, using the bed pan, and the surroundings are made tranquil and cheerful. An ice bag is applied to the stomach to prevent distension and to favor contraction while it relieves the pain. The day of a hemorrhage the patient is given by teaspoonfuls iced milk up to 200 or 300 c.c. and one to three fresh, well-beaten eggs, raw and cooled on ice. Bismuth in suspension is also given, 2 gm. to the dose, kept up for ten days in severe cases. The amount of milk is gradually increased by 200 gm. at a time until by the ninth day the patient is taking 8 eggs and 1,000 c.c. of milk; 100 gm. of rice cooked in milk is then allowed, with two rolls (Zwieback). The sixth day 35 gm. of raw chopped beef is stirred in with the milk once and then twice a day afterward. Fifty gm. of raw ham and 20 of butter are added to the diet the tenth day. The number of calories is thus 1,135 the sixth day, 2,138 the ninth, 2,478 the tenth, and 3,073 the fourteenth day, and when the four weeks are past, a mixed diet is allowed, the meat no longer taken raw. All pains vanished on this diet by the third day in 12 cases, by the fifth in 6, by the eighth in 5, by the fourteenth in 1; one patient had a continuous pain on pressure, and 35 had no pains at all after this diet had been instituted. Its chief advantages are that the pains are abolished and that the patient leaves the hospital cured not only of his ulcer but of the underlying anemia or debility of any kind. Out of 25 followed to date, 18 have been in good health since; one patient has had occasional pains, but not enough to interfere with her working capacity, and 3 have had each a single transient period of pains for one to four weeks. One patient absolutely refused to follow the restrictions of the course and was dismissed uncured, rejecting the advice to have the readily palpated chronic ulcer ablated. Only 2 have had any bleeding from the ulcer since, and one of these patients left before the course of treatment was complete. The other has once in a long while vomited small clots, but has been otherwise in good health.

Wiener klinische Wochenschrift, Vienna.

56 (XVI, No. 45.) Zur Theorie der Inkubations-Zeit (period). C. v. Pirquet and B. Schick.
57 Zur Trachom-Infektion. L. Schmeichler (Brünn).
58 Casuistica. E. Urbantschitsch. Ear and Throat Affections.
59 (No. 46.) Measurement of the Brain. G. Anton (Graz).—Gehirnvermessung mittelst des Kompensations-Polar-Planimeters.
60 Changes in Central Nervous System in Whooping Cough. R. Neurath.—Veränderungen im Zentralnervensystem beim Keuchhusten.
61 Kraniektomie bei Epilepsien verschiedenen Ursprunges (of various origins). J. Donath (Budapest).
62 *Causal Agents of Cancer. L. Feinberg (Berlin).—Ueber die Erreger der Krebsgeschwülste der Menschen und Säugetiere. (Commenced in No. 45. See also Prowazek in No. 48.)
63 (No. 47.) *Zur Neurologie des Auges. Infantile und juvenile Tabes. O. Marburg (Vienna).
64 *Zur Symptomatologie des Diabetes mellitus. W. Mager.
65 *Zur abdominalen Exstirpation der hochsitzenden Mastdarm Carcinome (of rectum). T. Sato (Tokio).
66 (No. 48.) *Tolerance of Carbohydrates in Diabetics. R. Kolisch and F. Schuman-Leclerq.—Zur Frage der Kohlehydrattoleranz der Diabetiker.
67 Care of Insane at Home. A. Pilcz.—Behandlung von Geisteskrankheiten in häuslicher Pflege.
68 Zur chirurgischen Behandlung gutartiger Magen-Stenosen (benign gastric stenosis). A. Hermann.

62. **Causal Agents of Cancer.**—Feinberg defends himself against the usual criticisms of announcements in this line by stating that the histosporidium carcinomatosum which he has discovered is the result of years of cautious unremitting toil, and he publishes the description of it after mature deliberation. He first argues to prove that all the facts observed in cancer speak in favor of some animal parasite as the direct cause of the growth. The latter is in reality merely the results of the process of local resistance by the epithelium cells against the invasion of the parasite. His histosporidium appears as a nucleus surrounded by a clear zone and this in turn by protoplasm and an enclosing membrane. It has a dual life cycle, passing through one phase in the tissues and another outside, the latter requiring considerable time. This explains why direct inoculation of substance from a cancer does not produce the growth in other subjects. The second phase of the cycle must be passed through before the parasite is ready to renew its invasion of the tissues. No surgeon has ever been inoculated with cancer from casual contact with one, but long-continued contact with a cancer subject allows the cancer parasite to develop through its second phase and it is then ready for another invasion. The article is illustrated.

63. **Juvenile Tabes.**—Marburg reports a case of tabes in a boy of 10 who had acquired syphilis in infancy from a nurse. He also tabulates 34 other cases under the age of 21 which he has found in the literature. He remarks that all the symptoms observed in tabes in an adult are encountered likewise in infantile and juvenile tabes, the only difference being in their relative frequency or rarity. Syphilis was positive in all but 4, and in these was probable. It was acquired in 2, but in all the others had been inherited. The coincidence or succession of several infectious diseases, scarlet fever, diphtheria and measles after pertussis, or an injury to the head, seem to favor the development of tabes in children with a hereditary burden. In some of the cases an inherited predisposition to nervous affection was noticed; in others the onset of puberty apparently favored the outbreak of the tabes. Lancinating pains were noted in 21, girdle sensations in only 4, and initial headaches in 5 out of the total 35. Sensory anomalies were noticed in two-thirds of the patients, and Romberg's sign in three-fourths, as also bladder disturbances. In 12 there was total atrophy of the optic nerve or beginning blanching of the papillæ. In only a single instance were there no objective optic findings. In his experience, the development of the optic atrophy coincided with an arrest or improvement of the tabes. In his own ophthalmic service during the last nine months he has met with 55 cases of genuine optic atrophy, including 22 tabetics. Only 12 of these presented evidences of antecedent syphilis, and the interval since infection ranged from six to forty years, sixteen years in 3 cases. Only 7 of these 22 tabetic subjects presented the Romberg sign and there was no ataxia in any. In some, the tabes had been always mild since its inception twenty to twenty-five years before, confirming the experience of others in regard to the mildness of the cases in which optic atrophy is a prominent symptom at any time in their course.

64. **Symptomatology of Diabetes.**—In Mager's patient the pulse, from 44 per minute in a reclining posture, increased to 66 when he sat up, dropping back to 44 when he reclined. The beat and curve resembled those observed during convalescence from typhoid. The necropsy confirmed the assumption of degeneration of the heart, probably from the acidosis of the organ and loss of normal alkalinity.

65. **Extirpation of High Cancer of Rectum.**—Sato mentions that he has operated on 20 cases of rectal cancer by the

perineal or sacral route during the last two and a half years in his private hospital at Tokio. He describes another case in which he preferred the abdominal route. He made his incision between the umbilicus and symphysis, retaining the anal portion of the rectum, closing the upper end, after resection, making an artificial anus in the center of the abdomen. He fastened the colon in a gentle curve to the artificial anus, which allowed the feces to accumulate in it as in a pocket and thus ensured continence. The extirpated tumor proved to be an adenocarcinoma with glandular metastases, but the patient has been cured and in good health to date, more than sixteen months. By this method the anal portion of the rectum can be examined frequently and recurrences detected early. The more inaccessible the rectal cancer the more imperative the indications for this technic.

66. **Tolerance of Carbohydrates in Diabetes.**—Kolisch, in continuing his research on the dietetics of diabetics, has found that albumin is responsible for the glycosuria in severe diabetes, not the carbohydrates. He gives the tabulated findings in 4 severe cases in which after establishing by dietetic means a constant balance between the intake and output of carbohydrates and nitrogen, he then suppressed all albumin and substituted it by carbohydrates. The "standard ration" represented 2,500 calories a day, and included 250 gm. green vegetables; 200 gm. butter; 200 gm. sausage consisting of 34.1 albumin; 300 gm. lean beef; 150 gm. aleuronat bread (representing 20.57 per cent. carbohydrates), a pint of coffee, of bouillon and of wine. When the balance was established on this standard diet the albumin and meat were substituted by equal or larger amounts of potato, 300 to 1,000 gm. The supposed limits of toleration for carbohydrates was exceeded even on the "standard ration," and yet further addition of carbohydrates caused only a trifling increase in the amount of sugar or a marked reduction, when the ingestion of albumin was restricted. Even after return to the "standard diet" the proportion of sugar remained low. The albumin, not the carbohydrates, is therefore responsible for the glycosuria; the carbohydrates have only a subordinate share in its production. He thinks that these facts corroborate his assumption that diabetes is primarily due to an abnormal cleavage of the carbohydrates, induced by some toxic factor. Also that the toxic factor is due in some way to the ingested albumin. He emphasizes the necessity for keeping the number of calories down to as low a figure as compatible with normal functioning, and remarks that the benefits derived from oatmeal, potato and milk cures in the treatment of diabetes are readily explained by the results of his tests.

Gazzetta degli Ospedali, Milan.

Last indexed page 138.

69 (XXIV, No. 143.) Sulla pretesa specificita delle nefrolisine e sulla nefrotossicita dei sieri normali omegenei ed eterogenei. E. Cioffi.
70 *Sulla terapia della tuberculosi secondo il nuovo metodo del Prof. Maragliano. G. Gemelli.
71 Grapes in Therapeutics. A. Borini.—L'uva nella terapia medica.
72 Di un metodo complesso di cura per l'uretrite cronica blenorragica. N. Muglia.
73 (No. 146.) L'emolisina del bacillo nei colera dei polli (poultry cholera). D. Calamida.
74 *Sulla asportazione di alcuni organi abdominali e sulla soppressione completa della loro circolazione. E. De Renzi and G. Boeri (Naples).
75 *Digitalis and Venesection in Pneumonia. F. Zuccala.—La digitale ad alta dose nella cura della pneumonite lobare.
76 (No. 149.) Reducing Power of Organic Fluids. C. Molon.—Sul potere riduttore dei liquidi organici.
77 Sulle alterazioni delle tuniche venose nel processo varicoso. G. Tomaselli.
78 (No. 152.) Sopra 2 casi di emineurastenia (Beard). T. Prodi.
79 *Contributo alla ricerca chimico-tossicologico della strienina nel sangue putrefatto (strychnin in putrefied blood). G. Astolfoni.
80 (No. 155.) Della emicrania oftalmoplegica periodica. C. Molon.
81 Considerazioni sulle lesioni traumatiche della volta del cranio. G. Stella.
82 L'esfoliazione nella pneumonite. A. Campani.
83 *Azione della formalina sul rene (on kidneys). V. Putti.
84 Caso di stenosi esofagea da compressione da lordosi osteomalacica. G. Fratti.
85 Equivalenti musicali epilettici. T. Montagnini.

70. Medication in Tuberculosis.—Gemelli quotes Maragliano to the effect that the best way to test a drug is to administer it for a certain length of time to an animal and then test the properties of its serum—obtained by venesection—in respect to given bacteria. This will afford us better insight in regard to the action of the drug on the bacteria than any other method. Tests in this way of turpentine, iodin, creosote and sodium cacodylate have recently been made at his clinic. The results showed that the action of the drugs separately was almost completely negative. Gemelli has tested some of these same drugs given simultaneously, believing that the interrelations between them might affect the results observed. He also describes a case of long-standing tuberculosis in the first stage which seemed to offer prospects of a cure by medication. Sodium cacodylate was administered by the mouth and an iodo-iodid solution with guaiacol injected. The condition seemed to be improving at first, but then took a turn for the worse, and the patient succumbed to repeated hemoptyses. He is convinced that this aggravation of the disease was due to the medication, and affirms in conclusion that the experiments at the Maragliano clinic are completed by his experiences, and that they demonstrate that certain drugs, such as iodin, not only have no favorable action in tuberculosis, but are distinctly injurious. Also that arsenic, as in the sodium cacodylate, on account of its known vasodilating properties, favors hemoptysis, and it is actually criminal, in his opinion, to prescribe it in tuberculosis.

74. **Behavior of Certain Viscera After Cutting off their Circulation.**—De Renzi and Boeri have been conducting extensive research which has convinced them that the omentum can almost be said to have an intelligence of its own, it assumes such a protecting rôle when certain of the viscera are injured. (See THE JOURNAL, xli, p. 888.) It has both a plastic and a mechanical, and also an antitoxic and an antibacterial action. They now announce that when the circulation of the spleen or of a kidney is entirely cut off by ligature of all its vessels, the omentum approaches it and soon envelopes it completely. A capsule of fibrous tissue is thrown around the organ and it shrivels away and is completely absorbed in a comparatively short time. The same thing is observed in regard to a foreign body. The omentum gradually envelopes it, forming an investing capsule inside which it is either completely absorbed or remains as a harmless body. When the circulation in the spleen is only partly arrested the omentum invests it and supplements the deficient circulation by means of its own vessels. If the omentum is resected before the vessels in the spleen are ligated, the animal succumbs. The spleen, after its circulation is cut off, decays like any foreign body, and the omentum seems to have the power to neutralize the poisons generated in this process of decay. The animals showed very little disturbance after resection of the omentum if the spleen was removed, while leaving it in place and arresting its circulation proved invariably fatal. Among the numerous interesting facts noted in this research is the appearance of albuminuria and casts in the urine after the circulation of one kidney has thus been cut off. Its mate is evidently overwhelmed at first by the extra task thrust on it by this sudden suppression of the other kidney. This is not observed after nephrectomy, or at least not to the same extent, as this operation is not undertaken except when the kidney has been more or less impaired for a time, thus gradually accustoming its mate to the extra task of compensation. Hemoglobinuria is also observed after cutting off the circulation of the kidney, which he explains by assuming that the decay of the kidney generates toxins which have a hemolytic action. In nephrectomized dogs the removal of the remaining kidney did not prove fatal for sixty-eight hours on an average, while ligating its vessels entailed death in forty-eight hours. This confirms Maragliano's assumption that in uremia the symptoms observed are due more to the cellular toxins arising from the decomposition of the diseased organ than from retention of the elements of the urine.

75. **Digitalis and Venesection in Pneumonia.**—Zuccala has treated 14 patients with lobar pneumonia by large doses of digitalis—as much as 4-5 gm. a day in 200 gm. of infusion,

supplemented in 5 cases by venesection. The results corroborate the assertion that digitalis has marked bactericidal action against the pneumococcus. This action may be called actually specific, as it is able to save guinea-pigs against fatal doses of the pneumonic toxi-albumins, or at least long postpones the fatal termination. Clinicians need have no fear of cumulative action. Venesection is a valuable adjuvant when the toxins of the disease process are unfavorably affecting the heart ganglia, when the symptoms indicate toxemia, and there is dyspnea, when the heart has an extra task imposed on it by the extent of the process in the lungs and the stasis in the minor circulation. Withdrawal of a certain amount of blood relieves the heart and checks the progress of the pneumonic process. If dry cups and leeches do not prove sufficient, venesection may accomplish marvels, as in some of the cases he describes in detail. He drew about 800 gm. blood.

79. **Detection of Strychnin in Putrefied Blood.**—Astolfoni is enthusiastic in regard to the delicacy and reliability of Vitali's method of detecting the presence of strychnin in putrefied blood. The strychnin is easily isolated from the organic alkaloids and this isolation is not interfered with even by advanced putrefaction. The blood is first acidified with tartaric acid and heated in a water bath to coagulate the proteid substances. It is then divided into two equal parts, each of which is digested for six hours at 70 C. with twice its weight of absolute alcohol. It is then cooled, filtered and the alcohol evaporated. The aqueous residue is cooled, filtered and evaporated on the water bath, and the residue dissolved in absolute alcohol. This last alcoholic solution is again filtered and evaporated to a syrup. It is then rendered alkaline with barium hydroxid and then shaken up with four times the amount of ether. The ether is then distilled and evaporated out to dryness. The residue is yellow, bitter and alkaline. It is neutralized with a few drops of a dilute solution of acetic acid. The filtered fluid is again rendered alkaline with barium hydroxid and again evaporated with ether. This ethereal solution is then slowly evaporated on the water bath with very little heat, and the crystalline residuum is the strychnin. Vitali established by tests on animals, etc., that the strychnin thus derived is almost absolutely pure while the loss is negligible. These assertions were fully confirmed by Astolfoni's six tests of blood to which a known amount of strychnin had been added. Vitali's technic was first published in the *Bolletino chimico e farmaceutico*, 1896, No. 16.

83. **Direct Action of Formalin on the Kidneys.**—Putti injected a 1 to 4 per cent. solution of formalin directly into the kidneys of a number of rabbits. It always induced necrosis and deposits of calcium salts accompanied by trivial fatty degeneration. The connective tissue proliferates abundantly to take the place of the destroyed parenchyma of the kidney. A small percentage of albumin was always found in the urine of the animals thus treated, but neither the aldehyd nor the formic acid reaction could be obtained from the urine.

Riforma Medica, Palermo.

Last indexed page 138.

86 (XIX, No. 46.) Contributo allo studio dei rumori musicali endocardici. C. Gavazzeni.
87 Bacteriology of Strangulated Hernia. A. Rodella (Zurich).—Alcune considerazioni sui risultati dell' esame batteriologico del liquido erniario in ernie strozzate.
88 Due casi di "Ulcus rodens." V. Casoli.
89 *Ulteriore contributi intorno alla eliminazione della formaldeide. E. Gianelli.
90 (No. 47.) *Paratyphoid in Children. G. B. Allaria (Turin).—Osservazioni sulla sindrome tifoide prodotta nei bambini dal "bacillus paratyphi."
91 Azione della nucleina da batterii patogeni e non patogeni sul potere battericida del siero di sangue normale. D. Enea.
92 Due casi di corea ritmica isterica. F. Sarcinelli.
93 *Enfisema sottocutaneo totale. A. Tozzi.
94 (No. 48.) Psoriasi e dermatite desquammativa incipiente; prurigo e morbi pruriginosi, nel concetto moderno. R. Campana.
95 Caso di aneurisma dell' arteria mesenterica superiore. M. Foa.
96 Meningite cerebro-spinale nei neri dell' Africa centrale. M. Levi-Bianchini.
97 Flebite simmetrica infettiva criptogenetica con sindrome polmonare grave preflebitica. A. Campani.
98 (No. 49.) Protective Action of Leucocytes Against Bacterial Toxins. S. Cappellani.—Dell' azione protettiva dei leucciti contro i veleni batterici.
99 Di un aneurisma vero dell' arteria splenica. Elastoma della tunica media. G. Tarozzi (Siena).
100 *Azione antitossica dell' iodio verso la tubercolina. O. Spadoni.
101 (No. 50.) Sulla dimetilamidobenzaldeidereazione. D. Guggino.
102 La cistectomia parziale nel trattamento dei tumori vescicali. A. Arcoleo (Palermo).

89. **Elimination of Formaldehyd.**—Considerable research has been undertaken in Italy to determine whether formaldehyd passes unmodified through the system. Tests of the urine, exhaled air and of the tissues of animals after administration of formaldehyd have absolutely failed to reveal its presence as such.

90. **Paratyphoid in Children.**—One of the two children was 2, the other 7, and both presented the typical symptoms of typhoid fever, including enlargement of the spleen. In one there was no hyperleucocytosis and the pulse was dicrotic. In the other there were roseola patches, and other members of the family were similarly affected. The fever persisted thirty-two and twelve days, terminating with a crisis in the first case. The agglutination test with typhoid bacilli was negative, but faintly positive with colon bacilli, but the cultures derived demonstrated that the infection was due to a paratyphoid bacillus. Alaria is convinced that the typhoid bacillus, the colon bacillus and the paratyphoid bacillus are each able to produce a specific disease, the symptom-complex of which may be identical for each, but which are in reality three different diseases, etiologically considered, and they can be absolutely differentiated by the agglutination test.

93. **Total Subcutaneous Emphysema.**—Tozzi knows of no other case in the literature similar to the one he describes. A healthy little girl, 9 years old, was suddenly seized with spasms of suffocation, the laryngeal spasms and cough suggesting diphtheria, but there was no abnormal temperature. The possibility of worms in the air passage was considered and santonin given. Ascarides were voided, but the child still had suffocating spasms, with great prostration, and coughed up somewhat hard sputa, auscultation revealing râles, but nothing else being abnormal elsewhere. The symptoms were somewhat mitigated the next day, but then the neck swelled, evidently due to the presence of air in the subderma. The emphysema enlarged until finally the chest and arms were swollen in the same way to an incredible size. The eyelids became so swollen that the eyes were completely closed and the entire body was thus puffed up with an almost total subcutaneous emphysema. The parents refused to allow puncture or any intervention, expecting the child's death any moment. She remained in this condition for six days, after which the symptoms gradually subsided and in less than a month she was restored to her usual health with no traces of her peculiar experience. He thinks that the emphysema was probably due to some laceration of lung tissue in the primary laryngeal spasms and violent coughing.

100. **Antitoxic Action of Iodin in Regard to Tuberculin.**—Spadoni found that guinea-pigs did not lose in weight when tuberculin and iodin were injected together or consecutively. Either alone caused marked emaciation. He therefore assumes that the iodin has an antitoxic power in respect to the tuberculin.

British Medical Journal, London.

January 23.

103 *Etiology of Carcinoma. Keith W. Monsarrat.
104 *Carcinoma of the Colon and Its Treatment by Colectomy. Bilton Pollard.
105 *Radium Bromid: Notes on Some Cases in Which It Has Been Tried. Jas. M. Davidson.
106 Case of Rodent Ulcer Treated with Radium. Gerald Sichel.
107 *The Leishman-Donovan Body and Tropical Splenomegaly. Patrick Manson and George C. Low.
108 *Human Trypanosomiasis on the Congo. J. Everett Dutton, J. L. Todd and Cuthbert Christy.

103. **Carcinoma.**—Monsarrat, in 1899, described an organism isolated from carcinoma. His researches have been continued, but were confined to carcinomata of the female breast. The organism is described at length. It was isolated from 58.3 per cent. of mammary carcinomata and was traced through two cycles of the life history, first the vegetative budding cycle, the other the sporulating cycle. When injected into animals

it is capable of infecting and inhabiting endothelial and epithelial cells. The organism initiates in endothelium and epithelium a process of proliferation as a result of which masses of new-formed tissue are built up, consisting of parenchyma and stroma, growing and extending actively from their centers of origin. The new cell-mass formation may be associated with growths in the neighboring glands and some evidence of visceral metastases was also obtained. Intracellular bodies are demonstrable in carcinomata of the breast presenting the same features as intracellular parasites of experimentally-produced nodules. He thinks the conclusion justified that the organism described is a causal factor in mammary carcinoma.

104. **Carcinoma of the Colon.**—Pollard concludes from its comparatively inactive course that carcinoma of the colon, if taken sufficiently early, can be successfully operated on with the expectancy of at least a long period of quiescence. The difficulty is to make the diagnosis early enough, it is so insidious in its beginning. In any case of chronic illness, however slight, associated with dyspeptic symptoms, a thorough abdominal examination should be made and a tumor of the stomach, intestines or other organs may be detected when least looked for. The symptoms are those of impediment to the intestinal contents. Indigestion or flatulence is of most common occurrence. When there are attacks of pain, colic, some loss of flesh, evidence of malignant growth of the bowel, and hemorrhage, a careful physical examination should be made and an abdominal tumor would probably be detected. Displaced kidney can always be returned by local pressure to its normal position, and he is inclined to rely absolutely on this sign. Carcinoma about the hepatic flexure might suggest an enlarged gall bladder and may invade the stomach and produce similar symptomatic symptoms. If there is an obstruction to the bowel it will rarely be possible to feel the growth, and the best procedure, he thinks, would be to explore the abdomen through a median incision below the umbilicus. If there is no material obstruction and the tumor can be felt, an incision should be made, as a rule, over the tumor, and long enough to allow the necessary manipulations. He insists on special care as to asepsis, as the open bowel is a constant source of infection. Pollard favors anastomosis by stitching rather than by the use of the common mechanical appliances. Seven cases are reported; all made good recoveries, though in some phlebitis of the superficial veins of the leg complicated the convalescence. It is remarkable how often this complication occurred. He has noticed it also in appendectomy, and thinks it may be due to some slight septic contamination of the blood.

105. **Radium Bromid.**—Davidson has employed radium bromid in rodent ulcer, tuberculosis of the skin and rodent cancer of the nose with decided improvement and arrest of the disease. He says it is fairly clear that radium produces profound changes in rodent cancer and that the absorption of the altered products leads to the blush that so often followed. If the exposure has been too long the blush may be succeeded by severe inflammation, resembling erysipelas, as in a case reported. He thinks it is possible that the products absorbed act as antitoxins, but there is no evidence of this. With large surfaces, care must be taken to avoid overexposing the parts to radium and to avoid constitutional disturbances. He thinks radium may prove to be a very valuable therapeutic agent, but it remains to be found in what diseases it is potent and what may be the best method of using it. In sealed glass tubes it may be applied readily to any part, be introduced into cavities, etc.; is painless in application; it does not even prevent the patient from reading, etc., when the treatment is going on. In several cases of carcinoma no specially good results occurred. He concludes by remarking that thorium, though about 1,000,000 times weaker than radium, has similar effects and can be obtained at moderate price and in large quantities. It can be used in a rubber bag and applied to the part. He thinks it would be well to try thorium in cases where radium is also being applied.

107. **The Leishman-Donovan Body.**—Manson and Low have investigated the life history of the Leishman-Donovan parasite, and think that they find in it a possibility to be reckoned with in tropical pathology. Its life history ought to be well followed out to determine how it obtains entrance into the human body. They think it is safe to assume that once in the spleen it multiplies by simple division and it gets out of the body, in all probability, through the blood current. A case of splenomegaly in which this parasite was found occurred in a European tea planter from Assam, and is reported.

108. **Human Trypanosomiasis on the Congo.**—Examinations were made by Dutton, Todd and Christy, of the parasite in the Congo region. They conclude with the following summary:

The examination of trypanosomes seen in stained specimens of blood from cases of trypanosomiasis, from cases of sleeping sickness (typical or doubtful), in the specimens of cerebrospinal fluid of the latter cases, and in the blood of experimental animals, infected with either of the three above-mentioned fluids, has led us to the following conclusions: 1. The trypanosomes seen in the blood of man, whether symptoms of sleeping sickness were present or not, have always been the same. The number of cases in which trypanosomes from the spinal fluid have been examined is at present too small to permit of a definite description of morphologic characteristics. We have seen forms in the cerebrospinal fluid similar to those described by Bruce and Castellani, and also longer forms similar to those seen in the finger blood of the same cases. 2. None of the human trypanosomes seen, whatever their source, have presented any morphologic appearance incompatible with *Trypanosoma gambiense*. 3. The parasites seen in rats inoculated with the cerebrospinal fluid of cases admitted to the hospital for sleeping sickness are the same as those seen in rats inoculated with the blood of cases of either sleeping sickness or simple trypanosomiasis. 4. The organisms seen in the blood of rats inoculated with trypanosomes from any of the three indicated sources have up to the present shown no differences from those observed in animals infected with *Trypanosoma gambiense*. We have observed the extraordinarily long forms with prolonged flagella and the stumpy forms with short flagella, described as occurring in animals inoculated with the Gambian parasite. We have therefore no reason to suppose that the organisms seen by use in the Congo are other than *Trypanosoma gambiense*.

The Lancet, London.

January 23.

109 *Old Unreduced Dislocations of the Shoulder-joint, Including Five Hitherto Unpublished Cases of Operative Treatment in One of Which Gold Plate Was Buried for 40 Days. C. B. Keetley.
110 Treatment of Diabetes Mellitus. R. T. Williamson.
111 *Certain New Methods of Blood Examination with Some Indications of Their Clinical Importance. A. E. Wright.
112 Intraperitoneal Rupture of the Bladder in a Girl, Aged 5 Years; Abdominal Section; Suturing of the Bladder; Recovery. H. Betham Robinson.
113 A Case of Acute Sulphonal Poisoning. Alfred E. Hind.
114 Case of Acute Traumatic Cholecystitis. Fred J. Smith and C. W. Mansell Moullin.
115 Two Cases of Osteitis Deformans in One Family. Walter J. Kilner.
116 Case of Total Extirpation of the Prostate. G. P. Newbolt.
117 Case of Veronal Poisoning. G. Fernandez M. Clarke.

109. **Dislocation of the Shoulder Joint.**—Kettley's article is an elaborate and detailed paper.

111. **Blood Examination.**—Wright describes a method of drawing off the blood into a calibrated capsule in a citrate of soda solution and how the filling in of the measured charge of citrate of soda solution can be accomplished, thus avoiding the embarrassments due to clotting of the blood, etc. He describes in detail the methods of manufacture of the automatic pipettes which are used, the procedure of drawing and examining the blood in dilution and otherwise. He says the method has no pretense to absolute accuracy, but, he thinks, that making a series of such tests yields very concordant results, considering the necessary limitations.

Intercolonial Medical Journal of Australasia, Melbourne.

December 20.

118 The Artificial Feeding of Infants. F. Hobill Cole.
119 Wet-nursing and the Selection of a Wet-nurse. W. Butler Walsh.
120 The New Lunacy Bill. J. W. Springthorpe.
121 Four Cases of Acute Suffocative Pulmonary Edema. Herbert M. Hewlett.
122 Management of Gangrenous Bowel (Herniated). R. A. Stirling.
123 Laminectomy for Paraplegia. E. Alan Mackay.
124 Case of Sarcoma of Medulla, Projecting Into the Fourth Ventricle. Frank Newman.

Journal of Tropical Medicine, London.

January 15.

125 New Culicid Genus from Uganda. Fred V. Theobald.
126 Weil's Disease in Egypt. F. M. Sandwith.
127 Cold Weather Mosquito Notes from the United Provinces—Northwest India. (Continued.) G. M. Giles.
128 Relapsing Fever in Uganda. Albert R. Cook.
129 Formalin in Leprosy. Wm. Robertson.